Founded in 1832

RAILWA

OCOMOTIVES AND ARS

JULY 1956

One of Five Specialized Railway Age Publications

FR-16

the finest in rubber draft gears





W. H. MINER, INC.

CHICAGO



another "BUFFALO" first ...

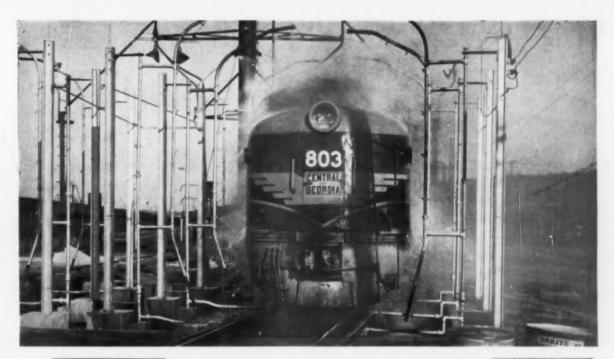
Eighteen years ago Missouri Pacific Water Car No. 600120 rolled out of St. Louis equipped with the first brakes designed to operate without brake beam hangers—UNIT TRUCK.

This month Buffalo hails another first—New York Central "Early Bird" Box Car No. 174853 equipped with the first braking system for freight cars without brake beams—BUFFALO SINGLE DISK BRAKE—X.

In less than 2 decades Buffalo has twice advanced the standard for safer, faster and more economical freight train operation.

BUFFALO BRAKE BEAM COMPANY

New York

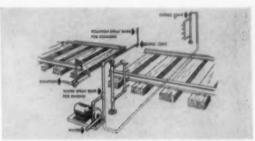


Original pressure-spray cleaning by Oakite cuts equipment-washing costs

Almost TEN years ago, Oakite FIRST pioneered the so-called pressure-spray system of cleaning and rinsing locomotive running gear and passenger cars. Today, many leading railroads are using this dependable Oakite system as standard procedure.

Above, you see the Oakite system in action. This sturdy washing unit was built to specifications from Oakite blueprints. Entire unit was fabricated in the railroad's own shops.

Today, you can cut your equipment-washing costs by specifying Oakite pressure-spray cleaning and rinsing systems and by selecting any one of a wide variety of specialized Oakite cleaning compounds.



One of the typical automatic cleaning methods available from Oakite

Drawings and data of time-proved Oakite pressure system cleaning are yours for the asking. Drop a line to Oakite Products, Inc., (Railway Division) 46 Rector Street, New York 6, N.Y.



They snap-on—and stay on— WABCO® Dated Packing Cups

"Quick" and "Easy" are the words for WABCO Packing Cups. At the regular cleaning time, you snap them off, clean them and snap them on again. It is not unusual for these cups to provide satisfactory service for two or more cleaning periods under normal wearing conditions. Their high resiliency assures continuous cylinder wall contact with minimum leakage.

When you replace brake cylinder packing cups, seals and gaskets, be sure to specify the original brand, WABCO, and you'll get the same long service, time after time. The date of manufacture, mold number and piece number are molded into every part.



PUBLISHED MONTHLY BY THE

SIMMONS-BOARDMAN

PUBLISHING CORPORATION

EDITORIAL AND EXECUTIVE OFFICES:

30 Church Street, New York 7 79 West Monroe St., Chicago 3

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Publisher, New York

H. C. WILCOX

Editor, New York

A. G. OEHLER

Electrical Editor, New York

G. J. WEIHOFEN

Western Editor, Chicago

F. N. HOUSER, JR.

Associate Editor, New York

LILLIAN D. MILNER

Editorial Assistant, New York

E. L. WOODWARD

Contributing Editor, Santa Monica, Cal.

C. W. MERRIKEN, JR.

RIKEN. JR.

Business Manager, New York

MICHAEL J. FIGA, JR.
Director of Production, New York

BRANCH OFFICES:

1081 National Press Bldg.
Washington 4, D. C.
Terminal Tower
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214 Terminal Soles Bldg.
Partland 5, Ore.
244 Colifornia Street
Son Francisco 4
1127 Wilshire Blvd.
Les Angeles 17
3908 Lemmon Ava.
Dallas 19, Tez.

FOREIGN REPRESENTATIVES.

Sibley-Fields Publishing Company, Ltd. 48 London Wall, London E.C. 2, England Linder Presse Union GMBH International Advertising Agency (16) Frankfurt a Main Wittelsbacher Allee 60, West Germany





Railway Locomotives and Cars is a member of the Associated Business Popers (A.B.P.) and the Audit Bureau of Circulation (A.B.C.) and is indexed by the Industrial Arts Index and also by the Engineering Index Service. Printed in U.S.A.

PAILWAY OCOMOTIVES AND ARS

Founded in 1832 as the American Rail-Road Journal

JULY, 1956

VOLUME 130, No. 7

EDITORIALS

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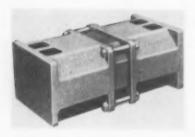
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Published monthly by the Simmons-Boardman Publishing Corporation at 1309 Noble St., Philodelphia, Pa., Entered at second-class matter, January 16, 1953, at the Post Office at Philodelphia, Pa., under the act of March 3, 1879 Subscription Price to rollroad employees only in U.S., U.S. possessions and Canada, \$2 are year, \$3 two years, payable in advance and postage free. Subscription price to railroad employees elsewhere, \$8 per year. Single copies, 50¢, Adverse correspondence concerning subscriptions to R. C., Van Niess, acting director of circulation, ad Church St., New York 2.



EQUIPMENT . . NEW IDEAS . . NEW USES



All-Rubber Draft Gears

A newly certified line of all-rubber draft gears is a all able in two classes—FR-24-58 which has an assembled length of 24% in and FR-20-18 which has an assembled length of 20% in. Either size can be used either on freight cars or locomotives.

No followers are required with the FR-24-58 gear. The shorter design uses two follower plates per gear which are of the standard type used in the majority of existing draft gears.

Both draft gears have a rated capacity of 34,875 ft lb at 2%-in, travel. The gears etilize patented rubber unit for lading protection and have compression characteristics to furnish slack-free train operation for

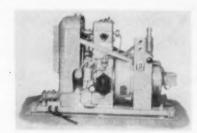
The draft gears are manufactured as self-contained units, precompressed for easy application to cars or locomotives. W. H. Miner, Inc., Dept. RLC, 200 S. LaSalle street, Chicago 4.



Nickel Cadmium Battery

This Nicad high output nickel cadmium pocket plate storage battery, which features long life and durability even under severe conditions, is being used for diesel engine starting, standby power, switch tripping and closing, and emergency lighting.

The active materials, nickel and cadmium oxides, are locked in finely perforated steel pockets formed into plates. Cell containers are made of steel. The electrolyte is a solution of potassium hydroxide. It is said no corrosive fumes are given off either on charge or discharge. In some stand-by installations, water has been needed only once in five years. Thus, low cost maintenance and dependability make it of particular value for remote or unstrended locations. Nickel Cadmium Battery Corporation, Dept. RLC, 72 Pleasant street, Easthampton, Massachusetts.



Diesel Caboose Power

The Model 45 diesel engine is used in a complete caboose lighting set designed to furnish power for lights, radio, refrigerator, electric range, and electric heating even when the caboose remains stationary for long periods of time. This compact, lightweight, single-cylinder diesel generator is offered in two sizes with capacities of 3 kw and 6 kw at 80 per cent power factor.

The 3-kw unit is approximately 3-ft long, 2½-ft high, and less than 2-ft wide; the 6-kw unit is only slightly larger. The diesel engine is a constant speed, 1,800 rpm, 4-cycle unit which features full pressure lubrication throughout, removable cylinder liner, roller crankshaft main bearings, valve-in-head construction, low cost pintle type injection nozzle, and full floating piston pin. The engine is arranged for hand starting, but a 12-v electric starting system can be furnished.

The Fairbanks-Morse a-c generator is direct connected and permanently aligned. An electronic voltage regulator, with no moving parts, holds voltage variations within 5 per cent. A special shock absorbing mounting for caboose service isolates the caboose from engine vibration and cushions the diesel generating set from car shocks encountered in service, Fairbanks, Morse & Ca, Dept. RLC, 600 S. Michigan avenue, Chicago.

Utility Lantern

The Radar-Lamp, for all types of outdoor use, features a cottage-type light-head incorporating a 2-½-in. by 2-½-in. circular chimney which throws a wide circle of light. It was designed to furnish supplementary illumination for repair crews, construction gangs and as an emergency



light source for industry, buildings and civil defense purposes.

The lantern is windproof and weatherproof and utilizes a positive action silver contact switch as well as a standard autolamp bulb. It incorporates two standard 6-volt batteries wired in parallel. The battery is self-contained and eliminates the conventional separate battery case,

The battery sealed in reinforced steel, is attached to the lantern light-head by two insulated screw caps. No wires or spring contacts are needed to connect the lantern to the battery. Burgess Battery Company, Dept. RLC, Freeport, Ill.

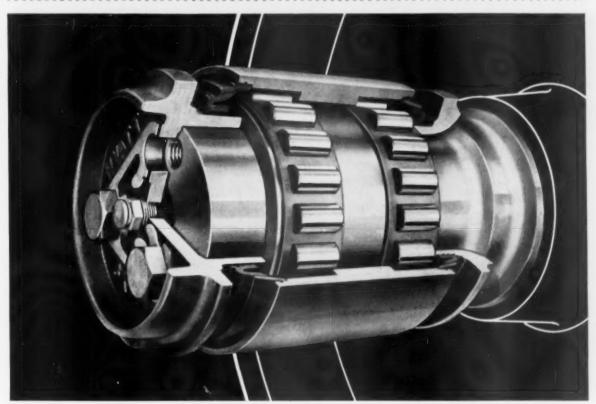


Automatic Welding Head

The model C Heliweld Automatic Head provides a completely automatic weld cycle. A single switch causes the holder to move downward and start the arc, and arc length is maintained constant throughout the weld. Electronically controlled, the unit is designed for de Heliwelding with Argon or Helim shielding gases, or a mixture of the two. It can also be used for ac Heliwelding.

The assembly consists of a head with a 32 in. long machine holder, which accommodates electrodes from 0.04 in. to 5/32 in.





STRAIGHT CYLINDRICAL ROLLERS have greater capacity, longer life—require less maintenancel

BIGGER FREIGHT LOADS



More Hyatt Roller Bearings are in use on American railroads than any other make

with lower operating costs!

HYATT HY-ROLL BEARINGS offer you big surings todaybigger earnings tomorrow! Savings today because Hyatt's new simplified design reduces both initial cost and maintenance cost. One bearing fits both old and new cars, needs no fitting adjustment. There are only four parts on the axle, all interchangeable. Hyatt Hy-Roll Bearings offer you bigger earnings tomorrow because cylindrical rollers have more load-carrying capacity, for a given size, than any other roller shape. What's more, a 3-year sealed-in supply of lubricant means good-bye forever to hotbox delays. If you're interested in the long haul-better take a long look at Hyatt Hy-Roll! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.





Another GM contribution to railroad prosperity

EQUIPMENT .. NEW IDEAS

. . NEW USES

diameter up to 24 in, long; a main con trol panel, and a remote control operator's station. Water and gas controls are included in the main control panel,

Arc length, once set, is maintained by automatic up and down movement of the holder to follow irregular surfaces. The head can be operated in the horizontal aswell as in the vertical position. The holder can be tilted by means of a micro-positioner, 6 deg either side of center. Both touch starting and high frequency type starts are available. Air Reduction Sales Company, Division Air Reduction Company, Dept. RLC, 60 East 42 street, New



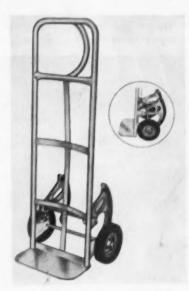
Abrasive Buff

Sectional Impregnated Abrasive Buffs of treated biased cloth, impregnated with abrasive grains bonded throughout their entire construction, have been designed for the buffing of all ferrous and non-ferrous metals. They are said to be competitive to sisal buffs, in the finer grit sizes, for normal cut-down operations to prepare surfaces for color buffing or plating. In the coarser grits they are competitive to setup wheels, coated abrasive wheels, Tampico brushes and other polishing and buffing

The buffs can be altered by the use of conventional spacers to adjust cutting action and to provide greater coverage. Carborundum Company, Dept. RLC, Niagara Falls, N.Y.

Stair Climbing Truck

The E-Z-Climber has been designed to drag loads over curbs and up and down stairways. Its two rocker-arms are said to act like an extra set of wheels to keep the



truck on a constant line for friction-free

The device has a heavy 1-in, outside diameter tubular steel frame, electrically welded for rigidity with curved cross members. Its 9-in. by 14-in. nose plate is of %in-in, steel. Semi-pneumatic steel disc wheels make the unit suitable for travel on rough surfaces. Load capacity is 600 lb and overall size is 46 in high and 18% in, wide. Shipping weight is 39 lb. Precision Equipment Company, Dept. RLC, 3716 N. Milwaukee avenue, Chicago 41.



Fastening Tool

With this Shure-Set fastening tool, a worker can manually drive a fastener through 1/4 in. steel. It will, according to the manufacturer, ease the light fastening work for craftsmen and end the dependence of the worker on less efficient, old-fashioned methods. Proper support of the fastener provides maximum utilization of the energy expended in swinging the ham-

The tool seats a fastener into a variety of materials such as concrete, concrete block, einder block, brick and steel. It will be marketed in a metal carrying case with long and short collars, 1/4 in. and 3/16 in. stud holders, and drive rods.

The fasteners are manufactured with a maximum of toughness and hardness to assure clean and simple penetration. Drive pins range from % in. to 3 in., while threaded stude are from % in, to % in, in length with varying length shanks. Olin Mathieson Chemical Corporation, Ramset Fastening System, Dept. RLC, Cleveland.

Epoxy Resins

These resins can be formulated into highquality, air-drying or baking finishes for steel, aluminum, zinc, tin plate, and wood. They are said to offer excellent adhesion and resistance to weather, salt spray, corrosive fumes and chemicals and, when properly formulated, can be applied to most surfaces by brush, spray, roller, flow or dip-coating.

Two of the resins are designed to react with amines, polyamides, and urea-formaldehyde resins. One is in solution for easy handling; the other is a solid product. Two others, primarily designed to esterify with vegetable oil acids, also undergo all usual epoxy reactions.

Possible uses are collapsible tube finishes, electrical insulation varnish and masonry paint. Scuff-resistant floor varnishes, indoor enamels, and tank linings can be prepared economically with the resins, Bakelite Company, Division of Union Carbide & Carbon Corp. Dept. RLC, 260 Madison avenue, New York 16.

Oil Leak Sealer

Oyltite-Stik has been developed for sealing oil leaks under pressures up to 75 psi and temperatures up to 400 deg F. The product seals pinholes, rusty parts in welds, etc., in oil tanks, pipes and containers of all kinds. It is furnished in stick form and is rubbed across the leaky area. The manufacturer claims that it can be applied while oil is flowing and there is no need for draining tanks or pipes.

The sealer is satisfactory for use with lubrication, vegetable or tar oils and gasoline. It is packed in a 6-unit box. Lake Chemical Company, Dept. RLC, 3052 W. Carroll avenue, Chicago 12.

Leak Detector Brush

The Leak-Detecto brush can be used to paint soap solutions around suspected air or gas leaks. Its precision machined valve feeds the solution when depressed.

According to the manufacturer, the device is compact, easy to carry, will detect the slightest leak, is easy to fill and utilizes any soap solution. Gas Appliance Stores, Inc., Dept. RLC, Columbia 5, S. C.

(Turn to page 88)



tough..... snow and ice can't stop the Spicer Railway Generator Drive!

Look at the record of more than 11,000 Spicer Railway Generator Drives operating all over the world . . . under the world's most extreme weather conditions

. . . and you'll find a remarkable record of constant service!

The Spicer Drive, being of the positive type and fully protected, is not affected by ballast, dirt, snow, rain, ice, sleet, or hot or cold weather.

The Spicer Drive assures a high degree of efficiency at all times, and keeps batteries fully charged under the most adverse operating conditions.

The Spicer Drive has no belts or chains to slip or come off. No fuel mixture to be affected by changing altitude or atmospheric conditions. Nothing to jerk, jar, jam or get jimmied up.

Spicer case-hardened alloy steel gears and anti-friction bearings operate in a light oil, reducing friction and heat losses to a minimum. Power transmission losses are remarkably low.

Spicer Positive Railway Generator Drives can be quickly and economically adapted to new car designs and reconditioning jobs. Write for further details.



DANA CORPORATION

Toledo I. Ohio



NEWS

Philbin Becomes Chief Mechanical Inspector

M. M. Philbin, AAR supervisor of loading, has been appointed chief mechanical inspector, Mechanical Division, succeeding R. L. Nelson, resigned,

Rock Island Investigating Plastic Car Body

The Rock Island is experimenting with a plastic body for its 35 ft 4 wheel Adapto (Railway Locomotives and Cars. February 1956, p 63). The plastic for the removable body or container of this car is reportedly "nearly as strong as steel." It does not conduct heat or electricity and it can be well insulated.

Among the possibilities the Rock Island has for this plastic container is in the handling of frozen foods. It could be taken off the car and placed in a subzero warehouse where it could be filled and scaled up.

Consideration is also being given to adding a diesel-driven refrigerating unit to the container-also to applying a small flask of bottled gas that would be released by thermometer control for necessary cooling.

Among the problems to be looked into in the future is the addition of a coach body on the new 4-wheel Adapto car for handling passengers. The Rock Island is reportedly also investigating jointly with the Minnesota Mining & Manufacturing Co, the possibility of an all-glass-fiber conventionalsize box car body. In this body, the doors, sides, ends, roof and even the structural members will be formed from glass fiber.

Progressive Inspection **Cuts Car Servicing Time**

"Experience has shown that considerable time can be saved where the car department is permitted to inspect cars progressively. . . . progressive inspection (means) assembling cars in fill-outs or blocks... to inspect and service such cars while other cars are being handled, , (this) reduces overall detention. The time when inspection and servicing takes place is important only in relation to the efficiency involved. The important factor is the quality of inspection and servicing finally performed.

. . the amount of time to be allotted for inspection and servicing . . . is . . . controversial. (As) inspection and servicing is as important as classification . time should be allotted for this work. It should not be considered as a necessary evil but rather as an integral part of the overall program."

These words were included in the message given to the Car Foremen's Association of Chicago by W. J. O'Brien, general car foreman of the Nickel Plate at Chicago. Continuing his talk, Mr. O'Brien pointed out that:

"The finest piece of machinery requires

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE JUNE ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road and builder	No. of units	Horse-	Service	Oth	er detail	
Electro-Motive	2		Road switching	GP-9 type. September		June" and
Canadian National Aleo Products	25		Switchers and road switching			
Electro-Motive	52		Switchers and road switching			
General Motors Diesel	67		Switchers and road switching			
	16		Pomenger			
Montreal Locomotive	. 80		Switchers and road switching			
CHICAGO & EASTERN ILLINOIS						
Electro-Motive			Road switchers	GP-9 type, 900. For		cost, \$680,- rst quarter

FREIGHT-CAR ORDERS

	FILE	SIGHT-CAR	CHILL	Chris	
Road and builder	No. of	Type of car	Cap.,	Length	Other detail
CANADIAN NATIONAL:					
ACF Industries	400	Automobile	50	-	For delivery by mid-1957
Canadian Car & Foundry	1.000	Hox	50		For delivery early in 1957.
Eastern Car	150	Box	30		For delivery early in 1957.
	1,000	Hox	50		For delivery early in 1957
	450	Longitudinal			
		hopper	70		For delivery by mid-1957.
	130	Air dump	50		For delivery by mid-1957.
International Railway Car	10	Cahooses			For delivery second quarter 1957. Cost. #148.000.
Magor Car	100	Flat	7.0	t-eller.	For delivery by mid-1957.
Marine Industries, Ltd	150	Flat	30	***	For delivery by mid-1957.
	200	Covered			
		hoppers	70	deline	For delivery by mid-1957.
	50	Refrigerator			Approximate cost, \$1,679,000. For delivery first quarter 1957.
National Steel Car	1,000	Box	50	400.00	For delivery early in 1957
	200	Refrigerator	50		Overhead iced. For delivery by mid-1957.
	200	Dropend highside			
	150	gondola Triple	70		For delivery by mid-1957
		hopper	70	-	For delivery by mid-1957.
CHICAGO HEIGHTS TERMINAL TRANSFER:					
C&EI shops Kansas City Southern:		Box	-	50-6	For delivery fourth quarter 1956,
Pullman-Standard Soo Line (Wisconsin Central):	. 50	Hopper	70		For September delivery.
General American Union Tank Car Co.:	. 15	Hopper	7.0	1000	Airslide. Delivery this year.
Company shops	123	Tank	-	-	For delivery second half 1956, first half 1957.
WESTERN FRUIT EXPRESS COMPAN	V:				
Company shops		Refrigerator		50-0	Mechanical refrigeration.
	50	Refrigerator	50	60-0	Mechanical refrigeration.
	100	Box	70	50-0	Insulated bunkerless, with damage

	PASSE	NGER-CAR ORDERS		
Road and bailder	No. of	Type of car	(Wher detail	
CANADIAN NATIONAL: National Steel Car Corp	20	Buggage	Approximate cost, \$1,700,000 delivery first quarter 1957	For
MINNEAPOLIS & St. Louis: Budd Company	2	RDC-4	Delivery in November.	

INQUIRIES AND NOTES INQUIRIES AND NOTES

Great Northern.—Directors have authorized purchase of 29, 1,750-hp road switchers and five 1,200-hp switchers. For delivery second quarter 1957.

FRIEGHT CARS:

Great Northern.—Directors have authorized purchase of 25 50-ton air-dump cars, 25 Airslide cars.

PASSENCIR CARS:

Allantic Cast Line.—ACL has ordered car shells—one each for baggage-dormitory car, dining car and baggage car from Pullman-Standard. Approximate cost \$400,000. Delivery late 1956.

inspection and servicing. . . . In view of this it should be an accepted fact that freight cars traveling thousands of miles at high speeds in all kinds of weather require servicing and inspection at some point. Car department officers should be realistic, however, and realize they cannot have unlimited time to perform their work. By the same flexibility, which is important because the time when cars are to be inspected and

serviced depends on conditions. Under certain conditions the operating department may desire to switch cars without inspection-at other times they may want cars inspected upon arrival.

Inspection of lading on or in open top equipment was considered particularly important by Mr. O'Brien. He thought that inspection of this type of equipment, as far as practical, should be made after switch-



ing operations have been completed and just prior to the movement of car outbound.

Oilers Should Get Manuals

Turning to the perennial hot box problem, Mr. O'Brien said that journal box servicing is time-consuming and that this work should be started as soon as cars are available. "It is important that inspection forces become familiar with (the various new journal lubricators and their) servicing requirements. Accessibility of tools, equipment and supplies in connection with token operating department officers must realize that time must be allowed for inspection and servicing and also that there is a limit to the number of employees who can economically be assigned to this work."

Calling for cooperation between the mechanical and the operating departments, the speaker said that it decreases delay, confusion and the possibility of serious injury to employees. Cooperation also increases journal lubrication is particularly important. In this connection it is advisable to furnish car oilers and inspectors with a copy of the AAR lubrication manual." C. M. McMullin, district general car foreman at Miles City, Mont., appointed district general car foreman at Savanna, Ill.

Illinois Central

ALBERT BLANKINSHIP, master mechanic, Kentucky division, transferred to lowa division. Headquarters, Waterloo, Iowa.

ROBERT E. WITTAKER, master mechanic. Paducah, Ky., shops, appointed master mechanic, Kentucky division, at Paducah.

Lehigh & New England

E. C. KAISER, superintendent motive power at Pen Argyl, Pa., appointed chief mechanical officer. Former position abolished, also that of general manager.

New York Central

C. I., Hall, supervisor of locomotive maintenance, appointed director—diesel methods and procedures (a newly created position) at New York,

Norfolk & Western

G. W. MEREDITH, master mechanic, Shenandoah and Radford divisions, appointed to newly created position of assistant general master mechanic.

M. R. Francis, general boilermaker, appointed master mechanic, Shenandoah and Radford divisions.

Roanoke, Va.

V. G. Whittington, foreman smith shop, appointed general boilermaker.

Personal Mention

Bangor & Aroostook

PALMER H. SWALES, assistant to mechanical superintendent at Derby, Me., appointed division master mechanic at Oakfield, Me.

Chesapeake & Ohio

C. A. NUCKOLS, foreman car department at Clifton Forge, Va., appointed general car foreman.

H. E. BLANK, foreman car department at Stevens, Ky., appointed general car foreman.

Chicago & North Western

EARL L. WALSTON, appointed general superintendent of motive power and machinery, Formerly master mechanic, Illinois Central, Waterloo, Iowa.

Chicago, Rock Island & Pacific

Chicago

- J. D. LOFTIS, assistant general superintendent of motive power, appointed director of research and development.
- R. F. Newton, electrical engineer, appointed electrical and mechanical engineer.
 - J. E. THUT, engineer of tests, retired.

Chicago, Milwaukee, St. Paul & Pacific

L. H. Rabus, master mechanic, Milwaukee Terminals, appointed superintendent of shops at Milwaukee.



North 33rd Street

Milwaukee 16, Wiss



Here's a look into the future

... with our Mr. Drager

Years after these solid aluminum bearings have been installed under the watchful eye of our Mr. Drager, reports from the field will read:

"Main and con rod bearings miked. No perceptible wear."

"Bearings checked and all in excellent condition. Reinstalled."

"Bearings checked to new dimensions."

How can we be so sure?

For one thing, we know the experience and meticulous care of Lew Drager and his department in installing these bearings will help assure long life. For another, we've been getting many such reports on aluminum bearings in the O-P after five, six and seven years of heavy service.

From conventional bronze-backed, bonded type bearings to solid aluminum bearings is but one of many improvements made in the Opposed-Piston engine over the years. This continuing search for better performance and longer life is an important part of our customer service. It is the basis for our constant product improvement—part by part. Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 6, Ill.



Be sure you get the Dividend of Quality—specify genuine Fairbanks-Morse replacement parts. They are identified by the orange carton—and the Fairbanks-Morse Seal of Quality.



FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES - MOTOR CARS AND RAILROAD EQUIPMENT - ELECTRIC MOTORS - GENERATORS - PUMPS - SCALES - WATER SERVICE EQUIPMENT - HAND LAMPS

Norfolk & Western

Roanoke Va.

(Continued from page 12)

- F. H. McFadden, assistant foreman, erecting shop, appointed foreman smith shop.
- J. M. Lyncu, gang foreman, appointed assistant foreman, erecting shop.
- C. F. PHILLIPS, appointed gang foreman.
- L. F. POPP, appointed mechanical inspector. Formerly gang foreman at Portsmouth, Ohio.
- H. L. Scott, Jr., mechanical inspector, appointed to newly created position of assistant master mechanic, Norfolk division.

Pennsylvania

- J. M. McGuigan, supervisor of car equipment, Buckeye Region, appointed assistant master mechanic at Pittsburgh.
- H. L. Wood, assistant master mechanic at Piteairn, Pa., appointed master mechanic, Northwestern region, Headquarters, Chicago,
- JOHN K. SHERWOOD, supervisor of car equipment, Northern region, appointed assistant master mechanic at Pitcairn, Pa.

Piedmont & Northern

Greenville, S. C.

FRED NOBLETT, master mechanic, retired.

J. Louis Rhomes, appointed master mechanic.

Reading

W. D. RICHARDS, master mechanic, Reading division, retired.

Seaboard Air Line

W. V. McEwes, appointed diesel supervisor (system) at Americus, Ga.

Supply Trade Notes

PULLMAN-STANDARD CAR MANU-FACTURING COMPANY. Executive offices are now located at 221 North La Salle street, Chicago 1.

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIVISION.—W. E. Crawford has been named Pacific coast sales representative, successing D. W. Dodge who has retired.

OILPURE. REFINER COMPANY. C. Raymond Ahrens. Inc., 30 Church street, New York, has been appointed authorized distributor of the Oilpure Refiner to all domestic railways.

(Turn to page 84)

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

	FREIGHT SERVICE (DATA FROM I.C.C.		M-240)			
			March	3 months ended with March		
Item N	ia.	1956	1955	1956	1955	
3	Road locomotive miles (000) (M-211)					
3-95	Total, atsam. Total, Dissel-electric. Total, selectric. Total, locomotive-miles. Car-miles (000, 000) (M-211):	4,197	1,989	12,909	14,403	
3-06	Total, Diesel-electric	38,446	35,402	111,226	101,442	
3-04	Total logometics miles	724 43,590	746 41,339	2,164	2,078 118,528	
1	Car-miles (000,000) (M-211):		9.2 - (3.37)	120,501	,	
1-03	Loaded, total	1,754	1,640	5,041	4.645	
E-06	Loaded, total Empty, total Gross ton-miles-cars, contents and onbooses (900,000)	947	914	2,780	2,638	
	(M-211)					
6-01	Total in coal-burning steam locomotive trains	10,428	11,315	31,324	32,279	
6-02	Total in oil-burning steam locomotive trains	957	1,280	3,329	3,694 282,156	
6-04	Total in Diesel-electric locomotive trains. Total in electric locomotive trains.	2,133	2,268	6,446	6,272	
6-06	Total in all trains.	124,293	114,676	359,587	326,410	
10	Averages per train-mile (excluding light trains) (M-211):					
10 01	Locomotive-miles (principal and helper	1.03	1.02	1.03	1.02	
10 02	Loaded freight cur-miles	43.2	42.5	42.7 23.5	23.8	
10 04	Empty freight car-miles Total freight car-miles (excluding caboose)	23.4	66 .I	66.2	65.7	
10-95	Gross ton-miles (excluding locomotive and tender)	3,064	2,969	3.043	2,947	
10.06	Net ton-miles	1,400	1,322	1,390	1,313	
12	Net ton-miles per loaded car-mile (M-211)	32.4	31.1	32.6	31.3	
13	Car-mile ratios (M-211):					
13 03	Per cent loaded of total freight car-miles	61.9	64.2	64.5	63.8	
14-01	Averages per train hour (M-211): Train miles	18.7	18.9	18.7	19.0	
16 02			55,468	56,309	55,365	
14	Car-miles per freight car day (M-240): Serviceable.	100,100			,	
11-01	Serviceable	47.3	45 4	46.6	44.6	
14-02	All	45.5	42.6	44.7	11.8	
15	All Average net ton-miles per freight car-day (M-240) Per cent of home cars of total freight cars on the line	956 41.5	852 19.5	939	836 51.0	
	(M-240),			91.1	31.0	
	Passenger Service (Data from	LC.C. M-2	13)			
3	Road motive-power miles (000)					
3-05	Steam	814	1.441	2,620	1,104	
3-96	Diesel-electric	20,829	20,624	60,943	60,989	
3-07	Electric Total	1,334	1,371 23,436	3,879 67,442	4,060 69,153	
1 111	Passenger-train car-miles (000);	22,977	23, 430	07,982	09,100	
1 08	Total in all locomotive-propelled trains	237,022	236,561	691,079	695.387	
1-09	Total in coal-burning steam locomotive trains	4.935	8,291	15,642	23,929	
1-10	Total in Oil-burning steam locomotive trains Total in Diesel-electric locomotive trains	1,665	3,538	6,010	9,977	
1-11	Total in Diesel-electric locomotive trains	214,350	208,652	9.83	614,743 9.68	
12	Total car-miles per train-mile	9.89	9.70	9.83	3 00	
	YARD SERVICE (DATA PROM I.	C.C. M-215				
1	Freight yard switching locomotive-hours:					
1-01	Steam, coal-burning	251,120	260,747	753,925	736,021	
1-0.2	Steam, coal-burning Steam, oil-burning Diesel-electric Total	26,983	43,234	81,633	122,857	
1-03	Diesel-electric	3.971,186	3,649,419	11,604,700	10,429,713	
1-00	Passenger ya.d switching bours	1,252,583	3,957,453	12,149,539	11,309,100	
2-01	Steam coal burning mans	6,958	10.899	21,143	30,142	
2-02	Steam, oil-burning	3,106	4,952	8,731	14.278	
2 - 03	Diesel-electric	253,540	249,651	744,452	737, 291	
2-06	Passenger ya d awitching hours Steam, coal-burning Steam, oil-burning Diesel-electric Total Hours per yard locomotive-day	290,244	292,034	852,462	858,398	
3	Hours per yard locomotive-day			5.9	6.7	
3-01			15.5			
3 05	Diesel-electric Serviceable	16.1	15.3			
3 06	All locomotives (serviceable, unserviceable and					
	ntored :	18.5	13.2	15.6	13.0	
	Yard and train-switching locomotive-miles per 100					
	loaded freight cur miles	1.68	1.67	1.71	1.69	
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	75	.76	. 76	76	
	busined right car-mins (with recomptives)	1.0	(3)	1.00	, 11	

SUMMARY OF MONTHLY HOT BOX REPORTS

Excludes B and trailing A units.

	Foreign and system freight	No. of care terminal	Miles car set		
	(thousands)	System	Foreign	Total	off
March, 1952 March, 1953	2,943,813	2,594	5 877 6 077	8,471 8,769	347,517 331,192
1954 March April May June July August September October November December	2,570,518 2,713,511 2,662,375 2,678,234 2,696,135 2,614,432 2,852,825 2,717,219	2,196 3,079 4,416 6,597 7,956 6,740 5,182 2,515 1,501	3,637 5,149 6,510 9,617 10,912 9,742 8,882 6,985 3,467 2,294	\$,853 8,228 10,926 16,214 18,868 17,310 15,622 12,167 5,982 3,795	455,813 312,411 248,353 164,202 141,946 155,756 167,355 234,472 454,232 725,070
1955 January February March April May June July August Saptember October November Docember	2,517,483 2,830,398 2,787,705 2,931,850 2,945,955 2,906,558 2,954,439 1,923,592 3,025,177 2,950,228	1,813 2,266 2,717 3,471 4,860 6,080 8,086 8,555 5,896 3,966 2,010 1,819	2,701 3,970 5,076 6,485 8,664 10,226 13,635 14,358 10,469 7,182 3,972 3,774	4,514 6,236 7,793 9,956 13,524 16,306 21,721 22,913 16,365 11,148 5,982 5,593	601,256 403,701 363,197 280,002 216,788 180,666 133,813 128,941 178,649 271,364 403,184 522,444
1936 January February March	2,794,161	2,029 2,570 2,517	4,302 5,611 6,212	6,331 8,181 8,729	462,029 341,542 346,853



SHOES ARE LIKE BOXCARS...WHY?

No one would put newspaper soles on a pair of fine shoes.

But aren't the old-fashioned floors, still often specified
for modern freight cars, much like newspaper soles?

Today you can specify modern flooring—N-S-F*—and profit from floors that never splinter, never need replacing... floors so strong they even add structural strength to the underframe of the cars.

*N-S-F (T.M.): NAILABLE STEEL FLOORING Made and sold only by



STRAN-STEEL CORPORATION

Ecorse, Detroit 29, Michigan . A Unit of



Complete engineering and cost data available from our representatives in Chicago, Philadelphia, St. Louis, Atlanta, Omaha, Deliver, San Francisco, Mantreal and New York.

6-55-6A



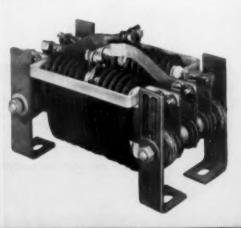
INSTALLING G-E RECOMMENDED CARBON BRUSHES ON A TRACTION GENERATOR

2. G-E COMMUTATORS retain smoothness in rigorous service because high-speed, high-temperature seasoning process sets segments firmly in place, cuts down friction wear and tear.

3. G-E GEARING is designed and qualitycontrol manufactured to carry the heavy starting loads and take the running shock loads encountered in today's heavy railroad service. 4. G-E RESISTORS have floating steel backbones that expand and contract freely with high temperature changes and therefore are not subject to harmful bucking forces.







7 G-E replacement parts for better locomotive operation . . .



 G-E RECOMMENDED CARBON BRUSHES are ideal for your replacement needs. Salected for the proper degree of hardness and grain structure to resist breakage and minimize wear on commutator surfaces, they have the riding qualities required to maintain a good surface film on the commutator.

HOW TO GET TOP VALUE FOR YOUR BRUSH DOLLAR

You can get the most for your maintenance dollar and keep the electric components on your GE-equipped locomotives running at top efficiency by using carbon brushes specifically recommended for the equipment.

Here's why your best buy in carbon brushes is the General Electric recommended grade. The best grade of brush is selected for each machine on the basis of extensive field experience and a continuing testing program. These brushes have a high degree of chip and

transverse strength; a proven ability to absorb shock.

This, plus their low-friction and non-abrasive qualities, will give you more mileage between brush replacement and maximum commutator life.

To get top value for your equipment maintenance dollar, always insist on G-E recommended carbon brushes. They're the best you can buy!

Locomotive and Car Equipment Department, General Electric Company, Erie, Pa. 128-28

Progress Is Our Most Important Product

GENERAL ELECTRIC

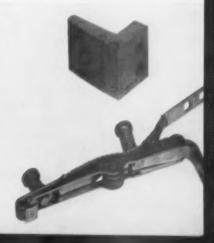
5. G.E MOTOR SUSPENSION BEARINGS give you longer service life—have a built-in oil-return feature which can save up to \$85.00 of operating costs per locomotive unit, each year.

6. G-E ARMATURE COILS are available as part of complete rewind kits for your convenience. Every coil is dimensionally accurate and quality insulated for longer life.

7. G-E CONTACT PARTS brook circuits quickly with a minimum metal transfer. This assures you of long service life from these parts.









No waste . . . with Redipak!

The Redipak lubricating pad consists of a special foam neoprene core encased in a cover woven of cotton wicking. Cored openings molded into the neoprene pump clean oil to the journal.

REDIPAK LETS YOU See for yourself

With Redipak there's no waste whatever—loose or otherwise—to work up, pack down, or cause waste grabs and resulting hot boxes.

The Redipak has been developed by solid bearing specialists... by men of long experience with the practical, down-to-earth conditions of railroading. As a result the Redipak is simple, economical, foolproof—and it works. It works so well, in fact, that in tests with no free oil in the box, Redipak pads retained enough oil for 10,000 miles of high speed operation.

But why take our word for Redipak's remarkable performance? Start testing them now . . . under your own operating conditions . . . and see for yourself!



NATIONAL BEARING DIVISION ST. LOUIS 10, MISSOURI



Just hook the grommets, rock the Redipak lubricating pad back and forth a few times, and out it comes. Redipak pads have been tested and proven in our special journal bearing laboratory and in hundreds of thousands of miles of road service.



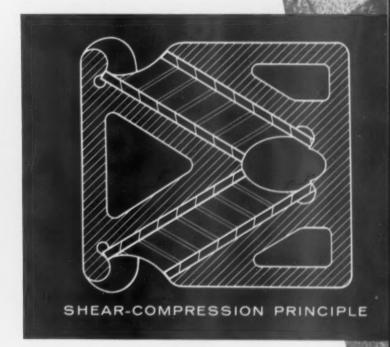
Better Railroading with National Specialties

N.M. & S.C. Co.

M-380

REASON:

Over 9 out of 10 diesel road locomotives are equipped with National Rubber-Cushioned Draft Gears. Since 1937, over 40,000 National rubber gears have given more than 200 billion miles of service. No other manufacturer can match this experience.



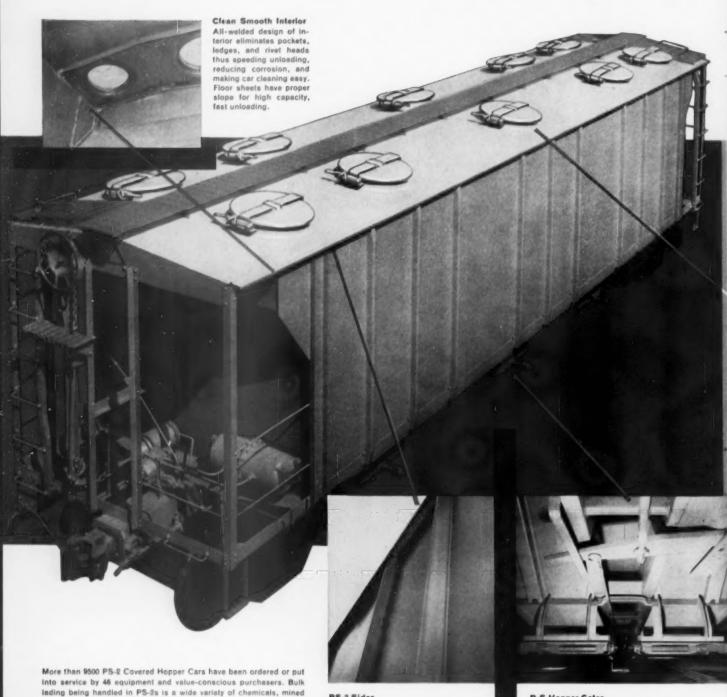
Ask any National representative what National's continued progress through research means to you.

NATIONAL MARIE CASTINGS COMPANY

Cleveland 6, Ohio

COUPLERS . YOKES . DRAFT GEARS . FREIGHT TRUCKS . SNUBBER PACKAGES . JOURNAL BOXES and LIDS

entrust bulk lading to



More than 9500 PS-2 Covered Hopper Cars have been ordered or put into service by 46 equipment and value-conscious purchasers. Bulk lading being handled in PS-2s is a wide variety of chemicals, mined products, and foods. For example, the efficient and progress-minded Denver & Rio Grande Western Railroad builds freight traffic by relying on its PS-2's for safe, dry, economical handling of cement, sait, feld-spar, fluorospar, perlite, potash, magnesite and ground mineral earths auch as filter clays and dolomite.

PS-2 Sides

PS-2 Sides are designed to stay new looking longer due to 4" overhang of bulb angle side plate. It eliminates the "catch-all" corner and makes the roof easy to clean. Smooth one-piece welded side eliminates corrosion and provides a smooth, clean car interior for fast unloading. Posts and side sheets joined by automatic arc welding.

P-S Hopper Gates

P-S exclusive design and make Hopper Gates are easily operated, positive sealing. Material flow can be reduced or cut off as desired. Hopper chutes are positioned properly for unloading into existing undertrack take-away devices. Faster cleaning interior and heavier side sheets reduce sledge hammer damage.

PS-2

covered hopper cars

Weathertight Hatch and Hatch Cover

Hatch coaming is of one piece pressed steel, weided to car roof sheets. Internal diameter is 2' 6", and coaming rises 6½" above roof surface. Upper lip of coaming curves down to help keep weather out. Hatch cover, of one piece pressed steel, makes tight contact with entire coaming lip. Center pressure locking is simple and positive. When open, cover does not extend over running board.





Weather Tested

Testing is a part of every P-5 Standardized Freight Car. And tests assure that the P5-2 meets the carbuilder's expectations for a superior product. Since an Important factor in P5-2 design is its ability to shed weather, keeping lading clean and dry, every P5-2 is subjected to a water test. Volumes of water are hose-applied to the junction between hatch coaming and cover, and to the entire car—top to bottom. Interior inspection then reveals any leakage for correction,

The economics of present day rail operation demand consideration for faster, less costly ways of handling dry granular bulk lading. The most advanced freight car designed to fill this railroad-shipper consignee need is the Standardized PS-2 Covered Hopper Car. Built by Pullman-Standard, this car includes many features which concentrate on keeping weather-sensitive bulk lading safe, clean and dry. PS-2 owners and users profit from its rugged construction, dependable low-maintenance service and extra-smooth car interiors. The PS-2's welded construction eliminates material retaining ledges, pockets and rivet heads thus speeding unloading, reducing corrosion likelihood and making car cleaning easy.

PS-2 circular hatches and hatch covers fit tightly to exclude weather and dirt. It is unnecessary for workmen to get near the roof edge to open or close PS-2 hatches. Hatch covers open along the length of the car and do not obstruct the running board. Hatches are located for fast loading and hopper floor sheets are properly sloped for fast unloading.

P-S design rugged cast steel hopper gates are machined to a close fit for ease of operation and tight seal against leakage. Gates deposit lading exactly where wanted for augur or other mechanical take-away devices.

While built with all the strength and quality features expected and found in all Pullman-Standard Standardized Freight Cars, the PS-2 has not overlooked design flexibility to meet specific railroad requirements: it comes in two sizes. The two-hopper PS-2, 2003 cu.ft., has 8 loading hatches, 4 unloading gates. The three-hopper PS-2, 2893 cu.ft., loads through 10 hatches, has 6 unloading gates.

The PS-2 is completely tested and proved . . . in the laboratory for structural excellence, on the production line for quality of workmanship and water tightness, and in service for actual performance.

Like the PS-1 Box Car, PS-3 Open Top Hopper and PS-4 Flat Car, the PS-2 Covered Hopper is helping railroads generate greater freight traffic revenues through new shipper benefits and higher levels of service.

Any Pullman-Standard office will be pleased to provide full information on the PS-2 or any P-S Standardized Freight Cars.

WORLD'S LARGEST BUILDER OF FREIGHT AND PASSENGER CARS

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 NORTH LA SALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

HOW GOOD IS THE FINISHED PRODUCT?

Whether you are concerned with manufacturing or with purchasing rolling stock, these are questions of vital concern to you—for ultimately they govern the durability and cost of the end product. Here is just one example how HELIABC welding is helping railroads gain new product quality at substantial savings... the unit being fabricated is a galvanized iron and mild steel refrigerator car.

Welding Speeds Average 30 In. Per Minute

Semi-automatic welding requires no special skill, and speeds two to three times faster than manual welding can be easily maintained. The Heliarc welded side and floor panels shown are fabricated of 14 and 20 gage galvanized iron and mild steel.

309 Ft. Of Top-Quality Welds Per Car . . . Minus Flux

In HELIARC welding, argon gas automatically shields the weld puddle from contaminating effects of the atmosphere. All 31 butt, lap, and flange joints in each car are of the highest quality.

Find out about the particular welding installation that can increase your production speed and unit quality, Call your local LINDE representative for detailed information on LINDE's modern methods for joining metals.



Semi-automatic Fieliarc welding torch speeds and simplifies fabrication of refrigerator cars.

RAILROAD DEPARTMENT Linde Air Products Company

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street II. New York 17, N. Y.

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Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - - -



A SPACE-SAVING, READY-TO-GO



125hp

TWO-STAGE AIR-COOLED

MOTORCOMPRESSOR

- Easy to install
- . No water jackets or piping
- No freezing problem
- Air cooled intercooler
- Constant speed or dual control
- I-R Channel Valves

Valve Spring .

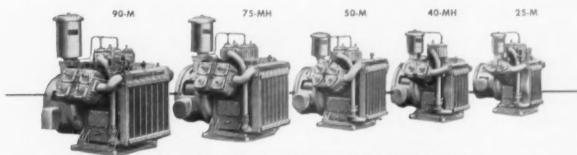
Lyalve Channel

High Efficiency
Quiet Operating
Exceptional Durability
Entirely Different
Stainless-steel Channels and Springs
Air-cushioned action
Found only on I-R compressors

Newest addition to the Ingersoll-Rand line of Type 40 compressors, this heavy-duty, air-cooled unit offers new convenience and economy for the generation of 80-125 psi air power in the 125 hp class. Shipped fully assembled, its compact, well-balanced design and small foundation requirements cut installation costs. And efficient two-stage compression with intercooling to near ambient temperature, reduces power costs all year around.

Choice of constant-speed control, automatic start-andstop control and manual or automatic dual control affords the most efficient capacity regulation for your particular operating requirements.

For complete information on all the time-saving, costsaving features of this 125-hp Motorcompressor, send today for your copy of Bulletin 3188.



These sizes complete the Type 40 range of air-cooled compressors

Ingersoll-Rand
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COMPRESSORS . GAS AND DIESEL ENGINES
ROCK DRILLS . PUMPS
TURBO-BLOWERS . AIR AND ELECTRIC TOOLS

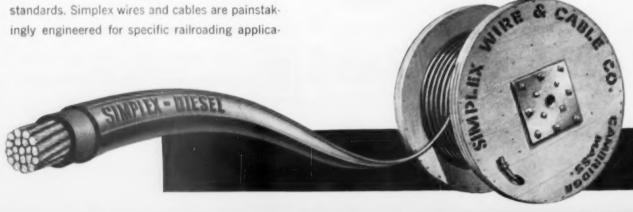


Powered for performance

Dependable locomotive performance is the very essence of efficient railroad operation. Little wonder, then, that extreme care is taken in selecting locomotive parts and supplies. Standards are high and specifications are rigid; and this applies especially to wires and cables. It is highly significant that SIMPLEX SPECIAL DIESEL LOCOMOTIVE and CAR wires and cables exceed the industry's own standards. Simplex wires and cables are painstakingly engineered for specific railroading applica-

tions. They offer pliancy of handling; resistance to abrasion, and to damage by oil, heat or flame. They have proven completely dependable under the most trying climatic and operating conditions.

Next time you order, be sure to specify SIMPLEX wires and cables. **SIMPLEX WIRE & CABLE CO.,** R. R. Dept., 79 Sidney Street, Cambridge 39, Mass.



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> freight cars get

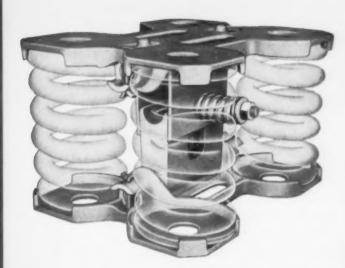
your

THE MORE THEY NEED

NEW-CAR SNUB-UP CUSHIONING!

OLD care carry costly lading tool
Why not cut off damage claims
at the source? The majority of them
eriginate in the older tars—a
condition to simply cured at the
first thopping with the application of SNUB-UP Snubbers!

V Roduce leding and equipment demage. The reduction in truck spring capacity. Absorbs vertical and luteral shocks. Violuces freight claims immediately. Vioring travel 1½ to 2½.



11-1

RAILWAY TRUCK CORPORATION

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GAIN THESE ADVANTAGES with METITION OF THE PROPERTY OF THE PR

FAST ASSEMBLY with Met-L-Wood, whether you fabricate in your shops or use prefabricated Met-L-Wood panels made to your exact specifications.

LIGHT WEIGHT Met-L-Wood panels can reduce weight to as low as 27% of the weight of comparable steel construction.

SOUND-DEADENING value of Met-L-Wood reduces outside noise levels, and is particularly valuable as sound-isolation when used for compartment partitions and doors.

VIBRATION DAMPING effect of Met-L-Wood helps prolong car life — gives passengers extra comfort.

and Smooth, Durable Beauty!

Whether plastic, painted steel, stainless steel, or aluminum, the smooth sweep of Met-L-Wood panels adds beauty to any car interior. Tough, abuse-resisting surfaces keep car interiors newlooking for years.

Details and technical data on Met-L-Wood panels, doors and partitions will be sent promptly on request.





since new conceptions in components create new and better cars... it is difficult



to show the impact of NTERNATIONAL STEEL'S corrective component engineering without picturing completed cars in our advertisements

this has led many to believe that we are car builders.

we are not.

we are precision fabricators of correctively designed components such as . . .

underframes and bulkheads for bulkhead flat cars, pulpwood cars and piggy back cars... underframes, side assemblies and floors for underframes, bulkheads and doors for the unit load car... underframes, side assemblies and doors for box cars...





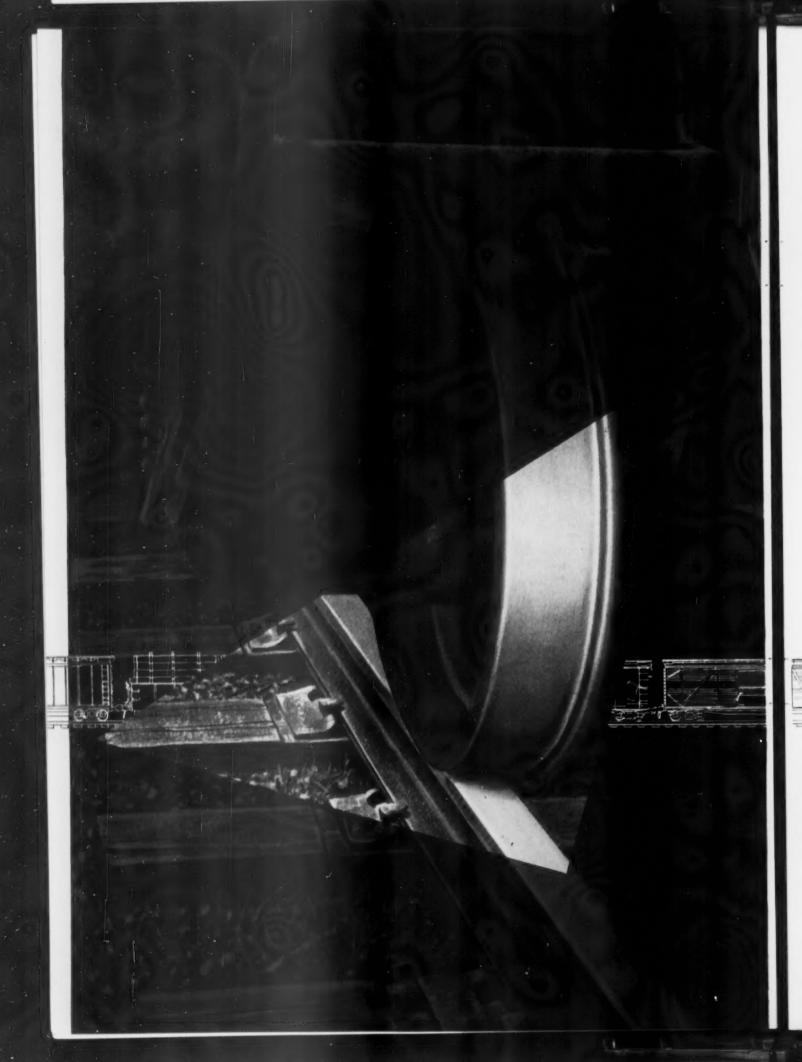


underframes, side assemblies and hoppers for hopper cars... underframes, side assemblies and doors for refrigerator cars... underframes for cabooses

component conception for profit potential.

gondolas . . .



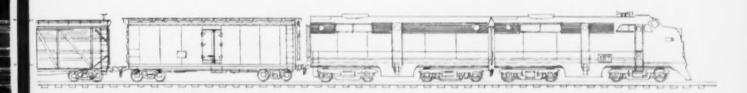


Buy Griffin EQS

FOR LONGER FLANGE AND TREAD WEAR!

The Griffin grain structure on tread and flange is at right angles to the rail—giving you a longer-lasting wheel.

Because of advanced casting methods . . . pressure pouring in machined graphite molds . . . the roundness of the Griffin EQS is practically perfect as cast. Absolutely no tread machining is necessary. The toughest metal *stays* where it reduces your costs . . . at the point of contact with the rail!



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445 N. Sacramento Bivd., Chicago 12
Plants strategically located to serve all railroads





Give the "green" to GRIFFIN and watch your costs go down!

Southern Pacific equips another 110 cabooses with Dayton V-Belt Axle Drives

Outstanding performance on 183 Caboose Drives now in service results in new order.

Savings in operating time, greater safety and increased utilization of open track induced the Southern Pacific Railroad, one of America's most progressive, to equip another 110 of its cabooses with two-way radio communication. Like the original 183 installations, proved reliable in $2\frac{1}{2}$ years of rugged service, power is provided by generators driven by Dayton endless Cog-Belt* Axle Drives.

Service on the Southern Pacific is rugged—the abrasive laden atmosphere and extremes of heat and

cold encountered demand a V-Belt that can take it! Dayton Cog-Belts are built of materials specially processed to withstand this punishment. Dayton Cog-Belts deliver 40% more horsepower and last twice as long as ordinary V-Belts.

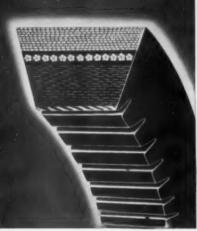
Dayton Cog-Belt Drives have been in continuous service supplying caboose power for major railroads since 1942. Why not call upon this 14 years of experience when you consider equipping your cabooses with two-way radio?











For low initial cost, easy installation, and least maintenance, specify dependable Dayton endless Cog-Belts on your Leece-Neville or Safety Car caboose drives.



Dayton Rubber

World's Largest Manufacturer of V-Belts

The Dayton Rubber Co., Railway Div., Dayton 1, Ohio

Specialized Railway Representatives in Atlanta, Chicago, Cleveland, New York, San Francisco and St. Louis



Why ATIONAL brushes are best for

Road Switchers



- . Maximum commutation over the wide range of service conditions
- . Minimum commutator wear under all conditions
- Superior dependability of exclusive shunt connection
- . Greater brush strength to resist shock and vibration

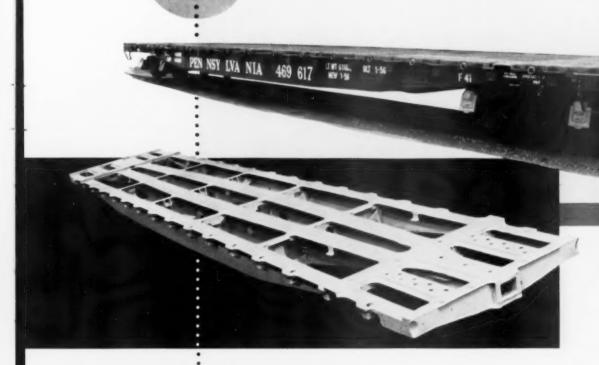
brush grade. There are good reasons why "National" brushes are best in this service...and why far more of them are used than all other makes combined!

Not only in road switcher service, but in all types of diesel-electric locomotive applications, "National" brushes provide the widest choice and the best performance because they are the product of a long-term brush development program specifically for railroad equipment.

Brushes are the vital link between power and service. Why settle for less than the best when it costs you the least in over-all expense of operation?

ATIONAL BRUSHES—Best for all types of equipment... Preferred for all types of service.

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70-ton capacity-53' 6" long.

P.R.R. Orders Commonwealth **Cast Steel Underframes** for 700 More Flat Cars

In 1934-5 the Pennsylvania Railroad built 1,500 new flat cars equipped with Commonwealth one-piece underframes. All of these cars are still in active service-an unusual record for flat cars. Since that time, additional lots of new flat cars have been similarly equipped, and 700 more are now on order. The record of highly satisfactory performance of the original lot of 1,500 cars justified the subsequent orders for Commonwealth Underframes.

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Thousands of flat cars with cast steel underframes in service on 15 leading railroads are proving their exceptionally long maintenancefree life and the sound economy of the investment they represent.

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September 1956 Centennial Number RAILWAY AGE

A SIMMONS-BOARDMAN PUBLICATION (ABC-ABP)

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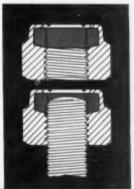
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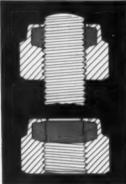
- 3 and exert a downward thrust bringing the lower flanks of the bolt thread into firm metal to metal contact with the matching nut threads, eliminating normal axial play.
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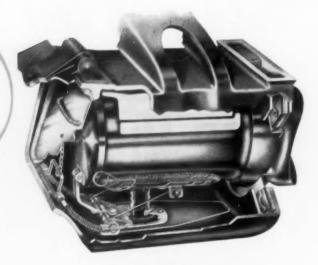
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By May 15, 1956, our sales had passed the 422,000 mark. Actually, we now have sold more than 425,000 car sets of Barber Stabilized Trucks to more than 160 major railroads and private car lines in the United States and Canada.

We mention these new facts for two reasons: (1) There is no better way to convey to you the endorsement which the railroad industry has given our products; the leadership they have conferred on our company. (2) We're just plain proud! Standard Car Truck Co., 332 South Michigan Avenue, Chicago 4, Ill. In Canada: Consolidated Equipment Co., Ltd., Montreal 2.

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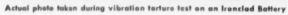
STABILIZED TRUCKS

JULY, 1956 . RAILWAY LOCOMOTIVES AND CARS

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For railway diesel starting







Section of Iranclad positive plate

Vibration can't loosen active material — can't shorten battery life



When a heavy duty storage battery gets the "shake treatment," battery life is literally at the mercy of the bond between the positive grid and the active material. Heavy shedding means short life.

But look what happens in an Exide-Ironclad Battery. Active material is held firmly captive inside the plastic power tubes. Hair-thin slits let electrolyte in, but keep active material from falling out. In prolonged vibration tests, this unique design has proved to be a valuable battery life stretcher. These findings are confirmed in the long, dependable service of Exide-Ironclad Batteries in typical high-vibration applications. This superior performance is only one of the many extra advantages in Exide-Ironclad Batteries — advantages that have earned them an unmatched reputation for long life and high capacity. When you order heavy duty batteries, or the equipment that requires them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.





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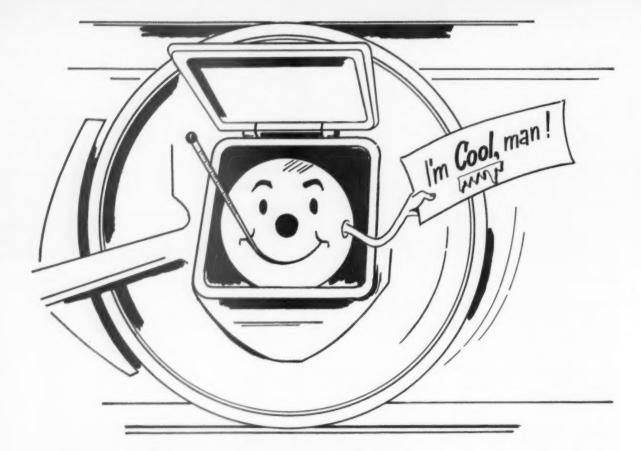
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EDITORIALS .

The Independent Car

The coincidental development of lightweight trains and such cars as the high-level ones being built by the Budd Company is a cause of wonderment to those whose business is train power supply. All of the recently built lightweights must be supplied with electric power from the locomotive or from a head-end power car. The Santa Fe cars are independent insofar as electric power is concerned, but must be supplied with steam for heating. There are cars in operation on the Pennsylvania which are completely independent of outside facilities of any kind, heat being supplied as waste heat from the diesel engines which drive the generators.

Up to the present time the lightweight trains have not entirely measured up to riding-quality expectations. Services are limited and fares have not been reduced. Should lightweights not measure up, it would seem that serious attention should be turned to the potentialities of the independent car. Given cars that can be completely independent of the locomotive for everything but traction, some very interesting things can be done. First, steam from the locomotive is not necessary and cars need have no steam lines. Second, the cars are free for movement in interchange. Third, the need for standby power, representing constantly increasing investment in fixed property can be considerably reduced.

Then there is another possibility. For those who object to or cannot use diesel-powered electric generators, there is reverse cycle heating. By using two compressors, the air conditioning system can be used to heat the car and the efficiency of this procedure is sufficient to permit operation with two 25-kw axle generators. There are those who have been advocating such development for a long time, and who have proved the practicability of such cars. But up to now they have been like voices crying in the wilderness. Unless the lightweights make a better showing than they have, up to now, perhaps it would be good business to listen to the voices.

Local Problems May Have Local Causes

Among the recurring puzzles that come up frequently for discussion between mechanical men is why one rail-road will have trouble with one thing while a neighboring line with similar operating conditions is plagued with an entirely different problem. Why, for example, will Railroad A be plagued with a high incidence of cracked cylinder heads but no ring trouble while Railroad B alongside experiences a great deal of ring trouble but no head trouble?

One thought that might at first seem too obvious to be worth stating is that such local problems might be caused by differences in maintaining practices and standards—not major differences that would be readily apparent but possibly minor differences that at first escape notice. But obvious though this may seem, it is a factor that is often overlooked—or not thought of until other possibilities have been investigated and rejected. The very fact that it is so obvious puts it in the same category as the "forest that cannot be seen for the trees."

LETTERS TO THE EDITOR

Why Can't the Railroads Keep Good Men?

The editorial in the May issue seems to question the future status of technically trained employees. This is becoming a serious problem as the roads experience increasing difficulty in obtaining adequately trained men and retaining them after they have developed to the point where they are of value to the industry. Our company is small and we do not have the same need for recruiting men with technical training nor have we found need to replace many such men. The extent to which this condition prevails is doubtless the result of the frequently voiced opinion that the future of the railroad industry in insecure because of governmental interference, unequal tax burden and the diminishing opportunity to make a fair return as compared with subsidized competition.

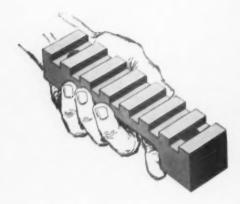
If your publication can lend assistance toward alleviating this unfair situation, I am sure it would go a long way toward making railroad service more attractive to young men with technical training.—W. N. Messimer, manager-equipment, Merchants Despatch Transportation

Corporation

We have had good luck so far in keeping college graduates we have taken for training. I think one reason why we may have been more successful is that we have chosen young men who come from this locality and who do not wish to go out of the state for work unless they absolutely have to.

At present we also have an extensive training program which gives all of our young engineers approximately one year's training in every department of the railroad. This helps us to determine where best to locate them and gives them an opportunity to see which department appeals to them most. We have been fortunate to have replacements or vacancies to fill which have absorbed some of the older men who have had two or three years' service so that the younger ones can see that they are with a company where their chances of advancement are good. Our small organization also helps us in personal contact between department heads and younger employees so that they feel they are a part of the organization.—V. L. Ladd, mechanical superintendent, Bangor & Aroostook.

Improve the efficiency of <u>any journal lubricator</u> with Magnus R-S JOURNAL STOPS



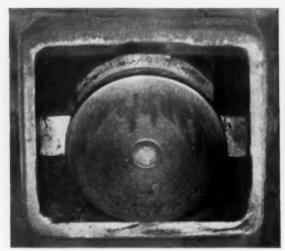
Longer bearing life and lower maintenance costs for trucks and journal boxes also yield big return on initial R-S Journal Stop investment

With conventional waste packing and Magnus R-S Journal Stops, you can run freight cars for three years between periodic servicing. That's been established by test experience to date.

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But that's not all. You also get longer bearing life and freedom from spread linings. You reduce the requirements for an effective box rear seal and increase the efficiency and service life of present dust guards and seals. That's vital to the successful operation of most waste substitutes.

Pad and mechanical lubricators benefit too. By keeping



Here's proof of Journal Stops' unique ability to hold packing in place even under extreme service conditions. This unretouched photograph shows the interior of a Journal-Stop-equipped box after undergoing an 11½ mph flat-switching impact test. Waste is still firmly seated under the journal.

the journal in its proper position, you keep the box from rising during impacts and braking — don't crush the lubricator or seal. Axle dust guard seats can't be scored either.

WHAT ABOUT COST? One private car line estimates it has recovered more than 90% of the total cost of Stops and installation in just the first 20 months of operation. Other roads report comparable savings. R-S Journal Stops not only pay for themselves in reduced maintenance costs. They get cars to destination with trouble-free journal boxes. Write for complete information. Magnus Metal Corporation, 111 Broadway, New York 6 or 80 E. Jackson Blvd., Chicago 4.

Solid Bearings

MAGNUS METAL CORPORATION

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Grease Containing Molybdenum Disulfide Is Being Used . . .



Will This Reduce Hot Boxes?

The latest weapon to be tried on a sizeable scale in the fight against the hot box is a simple chemical compound with a complicated name—molybdenum disulfide. Its chemical symbol is MoS₂ and the material itself is a blue-gray powder.

For use as an aid to journal box lubrication, the molybdenum disulfide powder is dissolved in a light grease. One gallon of this grease, containing about 12 per cent of the powder services from 40 to 50 cars or some 300 to 400 journals. The mixture is marketed under various trade names such as Molytex and Molykote. It has been given different generic names on different roads. including "moly," molycoat and molygrease. The latter appears to be the most meaningful as well as the most common. It will, therefore, be used as the label for the usual 12 per cent mixture of molybdenum disulfide in grease, the form in which it is used for journal box work.

Specific uses of molygrease vary widely between different users. One northern road, for example, uses it only in the winter. In about as complete a contrast to this practice as you can get, some southern lines use it only in the summer.

Some lines feel that the principal benefit from the use of molygrease will accrue in the hot summer weather when the hot box problem is at its maximum. Others feel that it does the most good in cold winter in keeping the packing from sticking to the journal. It seems safe to conclude, however, that maximum benefit results under temperature extremes—either hot or cold.

The extent to which molygrease is used on individual roads also varies widely. Most lines use it on freight car journals only. Two also use it on plain bearing passenger cars. In fact, one of these two use it largely on passenger cars. Finally, there are three different ways of applying the molygrease—with a bucket and small brush, with a round brush that fits in a special opening in a conventional oiler's can, and by a caulking gun to which a length of small diameter tubing is added to reach inside the journal box.

A check on 15 representative railroads found that nine use it to varying degrees; five do not use it; and one does not but soon expects to use it. The sampling also reveals some interesting reasons for using molygrease and some interesting reasons for not using it.

The roads that do not use molygrease have three principal objections to it. The first objection is that while molygrease may be helpful for breaking in new journal bearings, too much use of it might later interfere with the free flow of car oil. Its continued use at successive division points might adversely affect the wicking characteristics of either waste or pad-type lubricators. In other words, it might give a temporary advantage in getting a car over a couple of divisions, but in the long run the accumulation will be harmful to good journal box operation.

The second objection is strictly economic. Some lines simply feel that not enough benefit can reasonably be expected from molygrease to justify its cost. They think they can get greater overall benefit by spending the money available on other things.

The final objection is that the use of molygrease will make it more difficult to appraise the benefits from some of the more recent AAR recom-

Some lines apply molybdenum disulfide grease with ½-in, dia, round brush which dips into into center opening added to standard oiler's can.

mendations like controlled clearance bearings, elimination of loose waste and changes in the oil and bearing metal compositions. If too many factors are introduced it will, of course, be that much more difficult to determine just which ones are responsible for improvements that might be forthcoming.

What the AAR Thinks

While the AAR does not indorse the use of molybdenum disulfide, neither does it have data to oppose its application. Time has not been available for the AAR to run exhaustive tests on this material without the delaying of the other journal box research being conducted. Evidence seen by the AAR has not been sufficient to warrant any conclusion that molygrease will help reduce hot boxes. The AAR feels that you don't need molybdenum disulfide if you do what you should to the journal box and if your practice is deficient, molybdenum disulfide will not pull you through.

Evidence against, like evidence for the use of molybdenum disulfide, is not too concrete. What opposition does exist arises mainly from two sources: (1) complaints from some roads that molybdenum disulfide fouls waste packing and (2) some inspectors say that visual inspection indicates that molybdenum disulfide "seems" to coat the waste packing and therefore it "might" interfere with wicking.

The AAR also feels that insufficient evidence exists to say that molybdenum disulfide will help preserve journals on cars to be stored. Nor is it felt that the temporary lubricating film it provides will help much in cars coming out of storage. Free oil poured on the side of the journal after storage takes care of immediate lubrication needs just as well, As this free oil is usually added wherever mechanical forces are employed, the AAR sees no benefit from merely substituting the molybdenum disulfide film for the free oil.

Turning to theoretical aspects, the AAR feels that the unit pressures of the journal bearing are not high enough to get full advantage from the lubricating characteristics of molybdenum disulfide. As its film is generally thinner than that of the oil, the molybdenum disulfide can float in the oil film.

Four principal reasons were given for using molybdenum disulfide by the nine roads that use it (although no one of them listed all four):

1. Following storage or layover, to provide a temporary lubricating film until the journal box is warmed up enough for free oil flow.

To provide lubrication to a new brass during wear-in.

As a preservative to prevent checking or rust on cars to be stored or on wreck trains which sit around for extended periods.

 To furnish a slippery film over the journal in cold weather to keep waste packs (or lubricator pads) from sticking to it.

Frisco Is a Big User

The Frisco is one of the more extensive users of molybdenum disulfide. Consumption in summer goesup to 9,000 lb a month of a grease containing this compound. It is applied at all points where cars are set out and mechanical forces available.

Molygrease is used strictly in addition to regular journal box oil—it in no way diminishes the amount of free oiling given to the boxes. The Frisco feels that its function is entirely distinct from that of the regular lubrication—that it prevents metal seizure by providing a lubricated surface until capillary action gives a free flow of oil. Principal value is therefore to provide the temporary lubrication necessary to tide the box over the first few miles after leaving the terminal.

The Frisco first began using molybdenum disulfied on a group of refrigerator cars on which they were having from one to three setouts per week within 30 miles after leaving Springfield, Mo. These cars originated down the line and moved empty on a local freight for 44 miles into Springfield where they were loaded with cheese and put on a time freight. Despite fall movement and special attention, the rash of hot boxes developed within 25 to 30 miles after leaving Springfield.

Investigation revealed that the cars in this service had normally been idle for 3-8 weeks prior to loading, resulting in etched journals. The condition was not bad enough to cause trouble in the slow empty movement on the local freight, but it was not good enough to permit loaded running a high speed. The problem was

eliminated by applying the molybdenum disulfide grease at Springfield to provide some lubrication until the waste delivered the required quantities of oil.

Following this successful trial the Frisco made the use of molybdenum disulfide systemwide. Before its use, the average number of miles per hot box was 167,566 in the last seven months of 1954. The comparable figure for the same period in 1955 using the molybdenum disulfide was 206,237 miles. The Frisco attributes this improved hot box performance to the use of molygrease as other factors remained unchanged.

The Frisco also uses molybdenum disulfide extensively on cars that are to be put in storage, where it has proven helpful in preventing rusting and pitting. The material is applied to such cars while on the siding. In this way the final movement of the car into storage spreads the compound over the entire journal surface.

Cars are also coated upon removal from storage. In this case the car distributor notifies the local car foreman when given cars are to be moved. The foreman then sends a man in a truck to coat the journals with the molygrease.

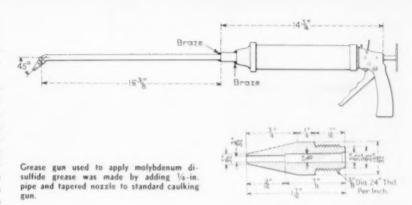
In general, the Frisco believes that molybdenum disulfide has improved bearing performance during all seasons and for this reason intends to continue its use throughout the year.

Helped on Tank Cars

Three other lines in the southwest which are also using molygrease are the Missouri Pacific, Texas & Pacific and Kansas City Southern. The latter was among the early users of molygrease, trying it first on tank cars which were loaded with acid and shipped out of Lake Charles, La. In one single month the KCS had 47 hot boxes on loads.

This situation was not unlike the cheese cars on the Frisco in that the empty tanks stood idle up to several weeks before loading. The condition was further aggravated by the corrosive atmosphere of the chemical plant which attacked the journals. The acute hot box problem here which naturally resulted was stopped by the molygrease.

Several roads thought molygrease was particularly helpful on tank cars. One theory advanced is that tank cars do not twist to conform to rail ir-



regularities as well as other equipment and therefore produce greater bearing problems. Another factor in tank car difficulties may of course be the dripping of water, acid or other liquids around the journal box.

On the MoPac the use of the material to date has been experimental. It has been largely centered around one point and without particular reference to types of cars either loaded or unloaded. While the line has not accumulated any direct comparative data to assess the value of molygrease, the MoPac does feel that considerable benefit has accrued where the material has been used.

T&P a Heavy Summer User

The Texas & Pacific, like the Frisco, uses molygrease rather extensively. In fact, the T&P uses it for just about the same purposes as the Frisco. The major difference between the practices on the two lines is that the T&P restricts its use mainly to the summertime.

During the summer months the T&P applies molygrease at all points where mechanical forces are available. It is applied to all cars returning to service from storage and to as many cars in through trains as time will permit. All cars put into storage are given a shot of molygrease for its preservative effect against rusting or pitting of the journals.

The T&P applies molygrease with a grease gun similar to a caulking gun. While no disadvantages to molygrease have developed, neither have any concrete examples of where molygrease has reduced or eliminated hot boxes. The T&P feels, however, that hot boxes are lesser in number than in previous years when molygrease

was not used and feels that it will have a major effect on all cars to which it is applied.

The Illinois Central is one of the minority of roads using molygrease to report a disadvantage. The problem is not in the molybdenum disulfide itself. The IC has noticed that the soap sometimes separates from the oil in the grease that contains the molybdenum disulfide, and this soap interferes with the free flow of the journal box oil. The problem here appears to be one essentially of improving the carrying medium.

Despite this one objection, the Illinois Central feels that molygrease will have a major beneficial effect in reducing bot boxes. So far the IC applies it to the journal bearing only when cars are repacked or when the wheels are changed out.

Burlington practice is similar to the IC's. Molygrease is applied to both system and foreign cars at all repair points whenever a brass is removed. A thin layer 1-in, wide is laid across the top of the brass by brush as an aid to lubrication during the break-in period while the brass is taking a set to conform to the journal diameter.

Molygrease is applied to both new brasses and to brasses that have been removed for inspection and replaced. The Burlington does not use it following layovers or at any other time when the brass is not disturbed. Neither do they use it as a preservative for cars going into storage. It is often applied to cars coming out of extended storage, however, when the brass is removed during the inspection made prior to return to service.

The Burlington has not made any controlled tests to get accurate figures on how much molygrease has reduced hot boxes, but the line feels that general results indicate that its use has been helpful.

Cold Weather Benefits

Up north interest in molybdenum disulfide as a summer aid to lubrication diminishes while interest in its winter usage increases. Apparently, at least at this stage, the most widespread acceptance is for extreme weather conditions, either hot or cold.

One midwestern line uses molygrease on all plain bearing head end cars that lay over more than 8 to 10 hours during the winter. It is also applied to cars coming from storage during the winter. It is used all-year around on cars that have been standing in the yard and on all cars, whether empty or loaded, that go over the rip track at large intermediate terminals.

Another northern road uses molygrease on all new brasses whenever wheels are changed, and coats the journals on wreck trains to prevent rust.

Numerically, the reasons for using molygrease equal the reasons against it—four apiece. Recapitulating the pros and cons, we find that three of the objections to molygrease were from non-using roads. The one disadvantage found by a using line was not considered serious enough to discontinue its use.

The benefits expected from molygrease present an analogous situation. Of the four principal reasons given for using molygrease, no one line listed all four, although several gave three of the four reasons. The material appears to have widest acceptance for application to stored cars being returned to service and for breaking in brasses. Its benefits following layover seem to be greatest in the coldest weather. Molygrease has least acceptance as a rusting or pitting preventive on cars to be stored.

The experiences of the 15 roads

covered in this survey is pretty strong evidence that molybdenum disulfide provides a temporary benefit. Perhaps the same amount of money spent in some other way would produce greater benefit as some lines claim. This question could be answered only by a test. The same is true of a second objection to the material—that its use complicates evaluation of other changes in journal box operation.

What seems the most important factor in determining whether molybdenum disulfide is good or bad is the final objection—that it may help over the next division or two, but its continued usage would be detrimental to good journal operation. If this charge is true, present programs for using molybdenum disulfide should be reappraised. If the charge is unfounded, this too should be determined so that more advantage could be taken of the known benefits that molybdenum disulfide has produced on those roads that are using it.

Riding High-New "EL CAPITAN" Does It





Forty-seven Budd-built high level cars are re-equipping Santa Fe "El Capitan." Outgrowth of full-length dome lounges, new cars were preceded by two similar coaches delivered two years ago. With diesel alternators, each car is independent except for steam heating needs. Coach alternators rate at 40-kw; diners have two 60-kw units for 85-kw maximum load. The air conditioning capacity is 16 tons on coach (left), and 20 tons on glass-roofed sky lounges (below). Mechanical equipment is housed in spaces over trucks. Lower level is kitchen on the diners; houses lounges and luggage storage on coaches. The coach weighs 162,210 lb, diners have 6-wheel trucks and weigh 208,600 lb. High-capacity cars mean new train will seat 496 instead of 350 on present equipment. With no change in total train weight, per-seat weight will be considerably reduced.





New body features applicable to all types of open-top cars, and structural features usable on all freight cars, are found on these open-rop cars.

The one-piece combination rear draft lug (right), bolster center filler and center plate.



The rotary coupler and yoke in the applied position.



95-Ton Open-Top Cars

- Lading cannot touch structural members
- · Skip welded for easy parts replacement
- Rear draft lug, bolster center filler and center plate cast in one piece

ACF has delivered 350 cars which, while designed for carrying rock on the Reserve Mining Company's 47-mile railroad, have a number of design innovations that are applicable to freight cars generally. The rock to be handled is known as Taconite, which is lighter than Mesabi ores, but extremely hard and abrasive. It was therefore necessary to develop a new design of car with greater cubical capacity, and one where the load carrying members are protected from the abrasive material.

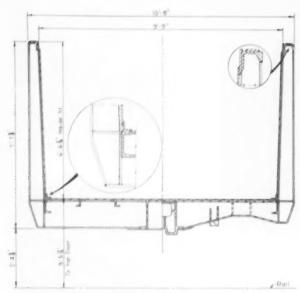
The 95-ton car body is of all welded design with all the load-carrying members shielded from coming in direct contact with the lading. Members that do contact the Taconite (the floor, sides and ends) are skip welded to the underframe and superstructure for ready replacement. The skip welding permits this to be done by working an air chisel in the voids between the welds to knock out the weld spots holding the sheet to the structural member.

In place of the AAR combination rear draft lug and bolster center filler, the cars have a steel casting, which, in the one integral piece, incorporates these two members plus the center plate. The purpose of this construction is to eliminate the difficulties experienced in making the combination rear draft lug and bolster filler casting contact both the roof of the center sill and the upper face of the bolster bottom cover plate, at the same time recognizing the tolerances prevailing in both the casting and the rolled center sills.

The new combination center filler casting will, by setting the bottom of the casting flush with the center sill bottom flange, readily take care of any variation in the two members. Transverse ribs on top of the casting create a clearance between the ribs and the top of the center sill. This clearance, or opening, is closed by welding. The welds of the casting to the center sills greatly exceeds the strength of AAR riveted design.

Cars Dumped While Still Coupled

As these cars will be emptied by turning them over on a car dumper without uncoupling from the cut, a rotary coupler was developed. This was done with the cooperation of the coupler manufacturers. After reviewing possibilities of all design submitted, the National Malleable



Interesting structural feature is shown by the blow-ups of the top and bottom corners of the car—the abrasive lading does not come into contact with any strength member.

& Steel Casting Company's final design was accepted for construction.

In order to provide a coupler with self locking features, the AAR type F standard coupler was selected and applied to the B end of car while a modified Type F was used in the A end of car for station.

By being able to dump the cars without uncoupling, the train line and air reservoir can be kept fully charged at all times, and cars can be moved through the unloading area without uncoupling.

The cars have a standard AAR Type F coupler on one end and the rotary coupler on the other end. The cars will, when made up in a train, always have to be headed in one common direction so that each car can be turned over for dumping about its own rotary coupler on the one end and about the rotary coupler of the adjoining car to which its conventional Type F coupler is joined.

The uncoupling mechanism is applied only at the A end of each car. The air hose, after considerable experimentation, is run on the left hand side facing the B end.

Principal Weights and Dimensions

Length, inside, ft-in.	25-8
Width, inside at top, ft-in.	9-9
Cubic capacity, level, cu. ft	1,569
Cubic capacity, 12 in heap, cu ft	1,818
	27-3 1/2
Length over end framing, ft-in,	22-6 Va
Length, coupled, ft-in.	29-10
Truck centers, ft-in.	16-4
Truck wheel base, ft-in	5-10
Coupler (drawbar) height above rail, ft-in	2-10 15
Center plate height (light car) above rail, ft-in	2-1 34
Width, max, over side plates, ft-in.	
Weight, Ib, light	
Height, overall	10.0

The hose is connected to straight, rather than regular angle cocks. The A end of the car has an air hose 33 in. long in place of the standard length of $22\frac{1}{4}$ in.

The shank of the rotary coupler has the same strength as the conventional Type F coupler but is rounded off in the corners to facilitate 180-deg. rotation. The AAR standard pin is used, but was shortened 2½ in. The yoke as shown has the front end enlarged to accommodate the revolving sleeves. Both the standard Type F coupler and the rotary was provided with ¼-in. tempered spring steel plates welded to the bottom side of the shank to eliminate wear.

The cars are equipped with automatic slack adjustors and empty and load brake with a 12-in. cylinder. The locomotives are equipped with the pressure maintaining feature on the brake valve. This permits handling heavy trains safely down a 1.5 per cent grade and eliminates time that would be required for setting up and turning down retainers.

Both sides and ends of the car body taper outward from the bottom to the top to facilitate the dumping of frozen lading. Furthermore, there are no ribs or rivets projecting on the inside of the car body to resist the release of the lading.

The Basic Construction

The underframe consist of AAR center sills, Z-26 41.2-lb. The bolster is of built-up welded construction with $\frac{1}{2}$ -in. web plates and 26-in. by $\frac{3}{4}$ -in. top and bottom cover plates. The three crossbearers are also of built-up construction with 7 in. by $\frac{1}{2}$ in. top and bottom cover plates and $\frac{3}{8}$ -in. web plates. Twenty 3 in., 9.8-lb zees are used for floor supports.

The side framing comprises 6-in. by $3\frac{1}{2}$ -in. channels, 18-lb bottom chords and 5 in. by $4\frac{1}{2}$ in. 19.1-lb bulb angle top chords. The bulb angle is shielded from coming into contact with the taconite by a 6 in. by $\frac{1}{2}$ in. bar. The side posts at the bolster are built up I-beams with a 7 in. by $\frac{5}{8}$ in. outside flange. A $\frac{7}{16}$ -in. flange at the side sheet tapers from $16\frac{1}{4}$ in. at the bottom to 7 in. width at the side plate. The $\frac{3}{8}$ -in. web extends from the bolster bottom cover plate to the side plate. At each cross-bearer the side posts are built up I-beam sections with 4 in. by $\frac{7}{16}$ in. flanges and $\frac{3}{8}$ -in. web. Side posts between crossbearer and bolster are 3 in. 9.8-lb Z-sections.

The end construction was designed to accommodate the car dumper without the face of the hand brake wheel projecting outside of the end plate.

To comply with the safety requirements for the hand brake only one end post in the center of the car was used. This end post is a built up I-section with 9-in. by ½-in. flanges and a ¾-in. web extending from end sill to end plate. The ladder stiles on both the side and end framing are utilized as load carrying members. The end sills are 6-in. by 3½-in. 18-lb channels.

The trucks are ASF ride control design with clasp brake, 36-inch multiple wear rolled steel wheels and Hyatt roller bearings. The trucks have a 100-ton nominal capacity, a 250,000-lb load limit, a wheelbase of 5 ft 10 in. and weigh 12,000 lb each.

These cars are in operation by the Reserve Mining Company for transporting Taconite between Babbitt, Minn. and Silver Bay on Lake Superior over the company's 47-mile railroad.

Learn About Air Brakes AND HAVE FUN DOING IT

24-RL AUTOMATIC BRAKE VALVES

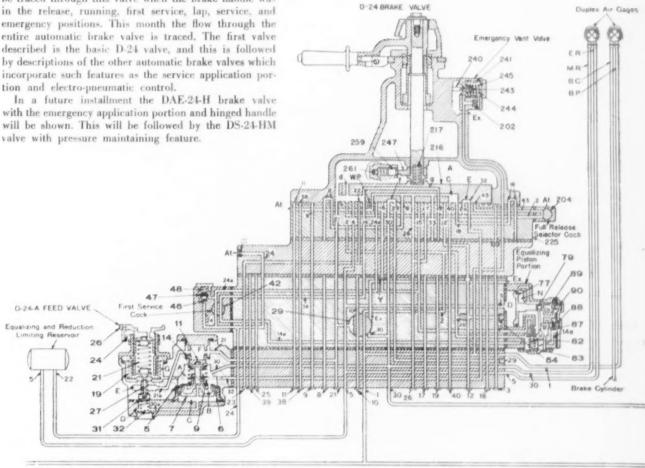
Air Brake in Color Schematics

The first installment of our Color Schematics began the discussion of the 24-RL brake equipment widely used on diesel electric road locomotives. In this first part the air flow at the rotary valve was explained. Air could be traced through this valve when the brake handle was in the release, running, first service, lap, service, and emergency positions. This month the flow through the entire automatic brake valve is traced. The first valve described is the basic D-24 valve, and this is followed by descriptions of the other automatic brake valves which incorporate such features as the service application portion and electro-pneumatic control.

with the emergency application portion and hinged handle will be shown. This will be followed by the DS-24-HM

24 RL Equipment-1B

In the first installment it was recommended that a get of Mongol colored pencils be used to color the air flow as it is traced through the various brake system com-



D-24 BRAKE VALVE

ponents. Colors applied with these Mongol pencils can be "fixed" after application by going over the areas with a dampened artist's brush. Water should be used sparingly, and time should be allowed so that each color can dry after brushing. If the pencils are not available in your area, drop a letter to the editor and we will tell you how they can be obtained.

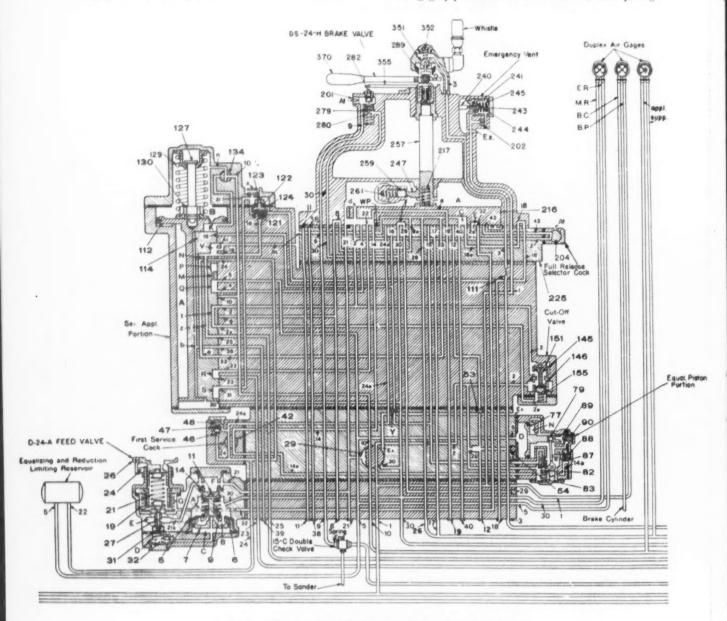
The 24-RL equipment is discussed in Westinghouse Air Brake's Instruction Leaflet No. 2606-1 which can be obtained free by applying to the nearest Westinghouse Air Brake Company branch office.

If any of our subscribers have lost their copies of the first installment of this Railway Locomotives and Cars feature, another copy can be obtained as long as the supply lasts by writing to us.

Below are the instructions for tracing the air flow through the first three of the 24-RL automatic brake valves.

D-24 Brake Valve

Main Reservoir Connections With a carmine Mongol pencil, color pipe 30 to the brake valve bracket and continue into the pipe bracket (passage 30) to the first intersection. Color to the left into the feed valve chamber A, up to the underside of supply valve 11, down through the piston to chamber C, passage 30a, chamber D and up to the regulating valve 27. Returning to the intersection, color passage 30 to the right and main reservoir gage pipe. Back at the intersection, color passage



DS-24-H BRAKE VALVE

30 upward to the rotary valve (taking in also, the short connection to brake valve cut-out cock 29). At the rotary valve color the cavity connecting 30 and 29 and finish passage 29 to the plug in pipe bracket. Using a damp brush, go over the colors and wait a few minutes for drying.

Feed Valve Connections Using an orange pencil, start in chamber E above the regulating valve, passage 21a, chamber F above the supply valve (11), and passage 21 down to the pipe plug in the pipe bracket. Color up passage 21 to the brake valve cut-out cock continuing up the passage to and including the space A above the rotary valve. Color down through passage d in the rotary valve, the small oblong space beneath the left edge of rotary valve, stopping at the rotary valve seat.

With the orange pencil, color passage 19 through the rotary valve to the plug in pipe bracket. Color passage 14, through the first service cock, into passage 14a to and including the chamber at the right of maintaining valve 87. Color passage 22 to the plugged connection 23 in the bracket. Go over colors with a damp brush and let dry before proceeding further.

Brake Pipe Connections With the yellow Mongol pencil, color passage 2 (starting at rotary valve seat), go into the horizontal section of this passage to the first vertical passage which is still passage 2. Color down and through the brake valve cut-out cock to passage 1 which leads to pipe connection 1 in the bracket. Returning to the first horizontal section of passage 2 (in the blank application portion) color passage 2b down and over into the space at the right of equalizing piston. This space must be colored completely—around the piston stem, the equalizing discharge valve and to the inner face of maintaining valve 87.

Color another branch of passage 2, which leads horizontally through the rotary valve seat to, and through the full release selector cock into passage 43, blanked at the rotary valve. Color branch 2a, which leads off passage 2 into cavity E in the rotary valve, down through passage 32 into the feed valve control chamber G. Color all around the telescopic diaphragm in that chamber. Returning to the pipe bracket, color passage 1 to the air gage. At the right end of the pipe bracket, color the branch of passage 1 leading up through the brake valve to the emergency vent valve. Do not color passages 15 and 16 in solid yellow because at this time there is no air present. With a yellow pencil, indicate that brake pipe air is present at some other time by coloring in yellow dashes. Dampen with brush and wait for drying.

Equalizing and Reduction Limiting Reservoir Connections With the light green Mongol pencil, color passage 4 starting at the rotary valve seat. Color into and including passage 5, chamber D, gage pipe and equalizing reservoir pipe. Dampen with brush and let dry. With the dark green Mongol pencil, color in dashes only, passages 24a, and 24 and pipe 24 to the reduction limiting reservoir. Dampen and dry.

Brake Cylinder Pressure With the pink pencil color the brake cylinder gage pipe in dashes. Dampen and let dry.

DS-24-H Brake Valve

Referring to Chart 2, you will note that a service application portion is used instead of the Blank Appli-

eation Portion of the D-24 valve. This is indicated by the letter S in the title DS-24-H. The service application portion contains: service application piston 112 and spring 129, timing valve 121, safety control cut-out cock 134, slide valve 114 and cut off valve 151.

Chart 2 can be colored like Chart 1 with certain variations. To make the first of these, with the carmine Mongol pencil color a branch of passage 30 which leads into the chamber beneath service application piston head (slide valve chamber). Color the strip between the slide valve and piston. Take the color through the port K in the piston head, passage E which is blanked by the cutout cock 134; passage n to the cut-out cock and chamber B above the piston. Color passage 10 through the cut-out cock, include a short branch which is blanked at the slide valve seat and continue down passage 10 through the brake valve cut-out cock to pipe 10 which leads to the safety control system and the application gage. Passages 25 and 8 should be colored in carmine dashes.

Passage 25 in the position shown on Chart 2 (Running) connects at one end to the exhaust via passage Z and cavity V in the slide valve and at the lower end to pipe connection 25 in the bracket. Passage 8 is blanked at the slide valve and at the plug in brake valve pipe bracket but open to exhaust via passage 8a and the rotary valve. Pipe 39 is connected to the space between slide valve and piston and blanked at the plug in pipe bracket must be colored solid with the carmine pencil. Dampen carmine colors and let dry.

Passage 2 leads through cavity t in service slide valve into passage 2a and to the underside of cut-off valve 151. Another branch of passage 2 leads into the upper end of the cut-off valve, continuing through the cut-off valve to passage 2 and then as shown on Chart 1. All of brake pipe passage 2 and its connections are to be colored with the yellow pencil. Dampen these lines and allow the color to dry.

With the light green pencil color as follows: Equalizing reservoir passage 4 starting at the rotary valve seat and going into the slide valve cavities Q, M and P, with a branch from passage Q leading to passage 5 and the equalizing reservoir. Passage 18 and 18a are to be colored in light green dashes. Passage 22 connects through the slide valve to passage 23 and pipe connection 23 in the bracket. This should be colored with the orange pencil. Passage 31, connected to cavity S in slide valve and exhaust (x) above timing valve 121, is to be colored in orange dashes. Passage 24 (reduction limiting reservoir) connects at the upper end to the exhaust via choked passage N and into cavity V, and must be colored in dark green dashes. Passage 17, blanked at the rotary valve and connected to pipe connection 17 in the bracket and pipe 26 outside the bracket, along with passage and pipe 26 are to be colored in gray dashes. The colors should be dampened and permitted to dry.

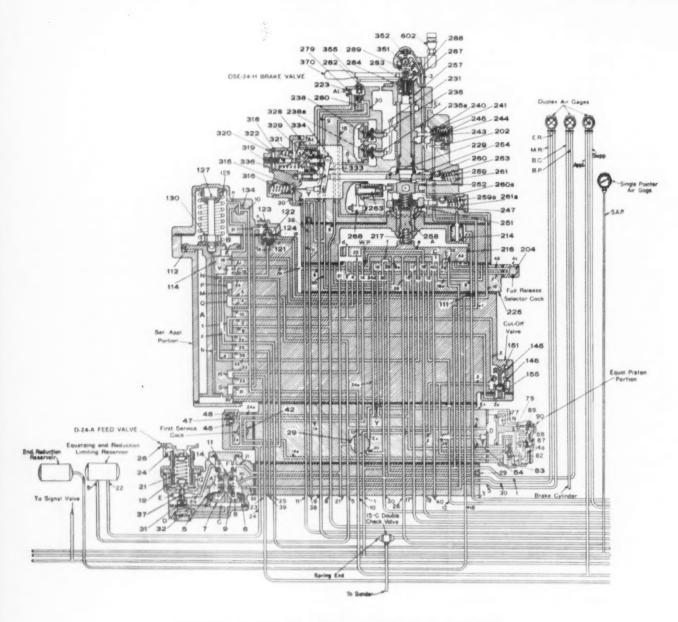
The hinged handle brake valve (the reason for the H in DS-24-H) permits manual sanding by depressing the handle all the way downward and there can be suppression of a safety control brake application by holding the handle in horizontal (depressed) position. A branch of main reservoir passage 30 leads off to the left in the rotary valve seat portion and into the spring chamber of sanding valve 279 to be colored with the carmine pencil. Passage 9 from the sanding valve to pipe connection

9 in the bracket is to be colored carmine in dashes. The chamber above deadman check valve 351 and passage 3, down through choke 111 and into pipe 3 which leads to the diaphragm foot valve, should be colored with the carmine pencil.

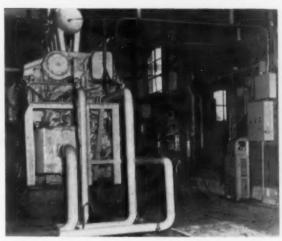
DSE 24-H Brake Valve

This brake valve has, in addition to the features contained in the DS 24-H type, an electro-pneumatic portion. When the electro-pneumatic portion is used another portion called the rotary valve housing is used. This portion is located between the brake valve body portion and the rotary valve seat portion. Note that passages 8 and

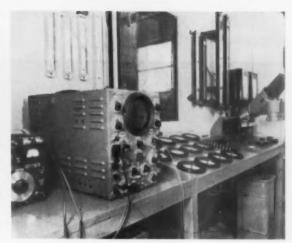
18 are opened or closed to the exhaust by exhaust valves 235a and 235. Passage 8 must be colored in carmine dashes, and passage 18 in light green dashes. The balance of the brake valve must be colored as on plate 3, with the addition of the following: Color with a carmine pencil the upper left hand branch of passage 30 and include the spring chamber of inlet valve 315. Passage 11 leading from chamber Y in the self-lapping portion to control pipe 11 in the bracket, must be colored in dark brown dashes. Passage 19, leading to pipe connection to be colored in orange, and passage 12 connecting to pipe 12 should be shown in orange dashes. Note that passage 3 (in solid red), leads through a strainer (214) located in the rotary valve housing.



DSE-24-H BRAKE VALVE



Ready here for testing is an Electro-Motive 1,000-hp diesel but the installation is designed for any diesel owned by the Seaboard.



Extensive instrumentation makes it possible to observe and record reactions deep inside an engine subjected to test situations.

Using Low Grade Fuels Requires Research . . . and the Seaboard Is Doing It

Small savings on every gallon of diesel fuel purchased and used can save large amounts of money for almost any railroad. Increasingly popular now is the use of lower grades of diesel oil. These are available at lower prices than standard specification fuels. They generally do not fully comply with the fuel specified by the diesel engine builder.

However, tests during the past few years have shown that high speed engines can use these lower grade fuels. Considerable research is being done on the selection of the oil which will give the best results, and also on the problems which develop because lower grades are being used. These can be problems of combustion, maintenance, engine wear and lubrication.

Because of the importance of fuel and efficient engine performance to the economy of its operations, the Seaboard is now operating a diesel engine test laboratory as part of its test department at Jacksonville, Fla. The reactions of an engine burning various types of fuel can be accurately determined only with complete instrumentation. This is impossible on a locomotive in revenue service, This was what led to the establishment of the SAL test engine installation.

The laboratory is designed so that any type of diesel engine used by the Seaboard can be accommodated. Accurate performance data on fuels, lubricating oils, engine cooling water treatment, engine parts and engine auxiliaries will be accumulated from these tests. Special work can be done to assist in solving unusual maintenance problems. The test program was initiated by C. H. Sauls, vice president operations, and by C. O. Johnson, test engineer.

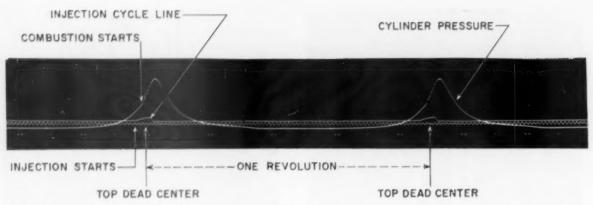
Detailed planning was started in November, 1954, and actual construction was started in March, 1955. The test plant was first operated in August, 1955. On October 10 the first

SEABOARD GETS A COMPLETE PICTURE OF ENGINE PERFORMANCE

General

Main Generator Voltage Indicating Meter Indicating Meter Engine Speed (RPM) Platform Scale Recording Smoke Meter Exhaust Cas Composition Recording COg Meter and Ocuat Acalyus Barometric Pressure Displacement and Velocity of Vibrating Surfaces Cylinder Pressure Curve Oscilloscope with crystal pickup in No. 8 Cylinder Oscilloscope with magnetic pickup from gear on crankshaft Oscilloscope with strain gage on injector rocker arm of No. 8 cylinder Vibration or Eccentricity of Rotating Parts Oscilloscope with dynamic micrometer on generator stubshaft

(table continued on next page)



Film strip from the oscilloscope record camera produces a record of the data from the screen which does picture the complete combustion process. The saw tooth line is produced from a 72-tooth gear mounted on the engine shaft. Each tooth represents 5-deg.

test was performed which yielded complete data. This program is operated by the testing division of the Seaboard's operating department. At the present there is one man assigned full time to the testing, and miscellaneous work by other test department personnel is equivalent to having a second man devote about half of his time to the project.

All engine auxiliary equipment including controls and batteries are installed as a permanent part of the engine test laboratory. The engine

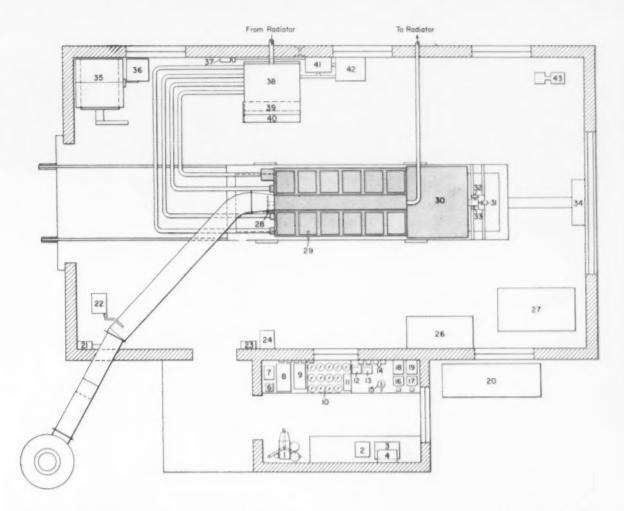
itself is mounted on a special car along with the main generator. This mounting is done in the diesel shop, and the car is moved over rails into the engine test laboratory where the car is jacked up to remove the load from the wheels. The assembly is then bolted to foundation plates. The engine and generator remain on the car while being operated with the car forming part of the engine foundation. This special bed plate will accomodate a 12 or 16 cylinder EMD engine, or with only minor modifications a 1600-hp Alco engine. For the current test program it is equipped with a 12-567AC 1,000 hp EMD engine and D-4 generator. This generator will have to be changed when larger engines are tested.

The test plant has a permanently installed bank of fan-cooled radiators—the type supplied for the Electro-Motive diesel in stationary installations. The load box is a resistance grid type with capacity to absorb 2,000 hp.

The test engine laboratory has an air conditioned instrument room containing most of the instruments used in determining the performance of the engine.

Most important among these is the equipment for measuring the pressures inside one of the engine cylinders during the combustion process. These are pressures detected by a quartz crystal in the No. 8 cylinder and are recorded on the screen of a cathode ray oscilloscope. This instrument is a two-beam type. By using an electronic switch in conjunction with it, the crankshaft angle and injection period are shown on the same screen with the combustion pressure pattern. The oscilloscope

		Temperatures		Pressure	
Seaboard Gets a Complete Picture Of Engine Performance (continued from preceding page)	Thermocouple and Recording Pyrometer	Thermocouple and Indicating Pyrometer	Cauge	Manometer	
Water					
Into Engine, Left	×		×		
Into Engine, Right Out of Engine, Rear Out of Radiator, Left	×		×		
Out of Radiator Left			×		
Out of Radiator, Right					
Into Lube Oil Cooler	¥				
To Fuel Oil Heat Exchanger	*				
Pump Suction, Left				×	
Pump Suction, Right				×	
Fuel Oil					
Out of Heat Exchanger	- 1		*		
Out of Pump Out of Heat Exchanger Out of Filter					
Into Engine	×				
Out of Engine	× ×		30		
Lube Oil					
Out of Engine					
Out of Scavenging Oil Pump					
Out of Engine Out of Scavenging Oil Pump To Cooler					
Out of Cooler	×.				
To Engine Main Bearing, Front	. ×				
Main Bearing, Front			×		
Piston Cooling			×		
Main Bearing, Left Rear Main Bearing, Right Rear			2.		
Main Bearing, Right Rear			×		
Scavenging Pump Suction				×	
Air Box, Left				×	
Air Box, Right	2.			×	
Crankcase				*	
Combustion Chamber Cas Exhaust Cas from Each Cylinder (12)		18			
Exhaust Cas Into Muffler		× .			
Ediaust Manifold, Front					
Exhaust Manifold, Rear				- 0	
Exhaust Pine				- 0	



Engine Test Building LEGEND

- I-Oscilloscope Record Camera
- 2-Vibration Meter
- 3-20 Point Recording Pyrometer
- 4 Carbon Dioxide Recorder
- 6 Dynamic Pressure Calibrator
- 7—Dynamic Micrometer Power Supply
- Two Beam Oscilloscope
- 9 Electronic Switch
- 10-Pressure Gage Panel
- 11-Engine Control Panel
- 12 Voltmeter

- 13-Ammeter
- 14 Manometers
- 16-Indicating Pyrometer with 24-Point Switch
- 17—Indicating Pyrometer with 24-Point Switch 18—Recording Tachometer
- 19—Recording Wattmeter
- 20-Storage Batteries
- 21—Recording Smoke Meter 22—Carbon Dioxide Analyzer
- 23-Engine Starting Panel
- 24-Load Regulator
- 26-Engine Electrical Controls
- 27-15-KW, Motor-Generator Set
- 28-Crankshaft Angle Pickup

- 29—Dynamic Cylinder Pressure Pickup 30—Main D. C. Generator 31—Tachometer Generator

- 32-Dynamic Micrometer 33-Rear Crankshaft Angle Pickup
- 34-Power Terminal Box and Shunts
- 35-Fuel Oil Tank
- 36—Auxiliary Fuel Oil Tank 37—Fuel Oil Pump
- 38-Lube Oil Cooler
- 39-Lube Oil Filter 40-Fuel Oil Filter
- 41-Fuel Oil Heat Exchanger
- 42-Fuel Oil and Engine Cooling Water Heater
- 43-Fuel Oil Transfer Pump

screen can be photographed with a strip film camera to make a permanent record of the combustion process. Many temperatures and pressures are measured with recording instruments, and others can be read.

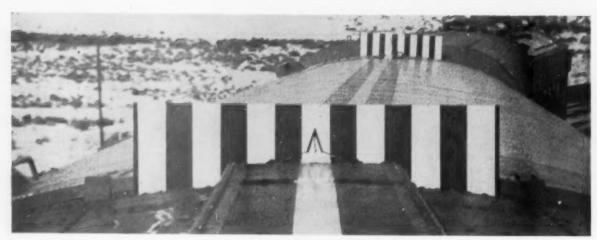
Equipment for the study of different types of engine vibration has been incorporated. This includes a dynamic micrometer for studying vibration and eccentricity of rotating parts. Exhaust gases from the engine are analyzed to give continuous record of the carbon dioxide and smoke. These help measure the combustion efficiency.

Already the complex and comprehensive instrumentation in this laboratory is giving the Seaboard valuable information. The problems arising from the use of "economy" fuels are most important, but testing of replacement parts and maintenance practices do constitute a major assignment.

Major goals of the test program are:

- · Combustion of fuel mixtures aimed at using some lower cost fuels
- · Combustion of low grade fuels exclusively
- Function of additive treated lubricating oils
- · Improvement of engine arrangement and component design.

According to the Seaboard this is the first diesel engine laboratory ever established by a US railroad.



ROAD TESTS showed the actions and relative displacements of the dome car compared with lightweight sleepers rounding curves at speed.



STANDING TESTS showed that 6-in. "unbalanced elevation" gave dome car an inward lean of 6.6-in. against 9.6-in, for standard car. Measurement at side sill showed position of eaves for both.

How Dome Cars

Union Pacific Runs Tests To:

- Compare domes with regular cars
- How fast they take curves
- How truck features affect ride

Just how much has been accomplished in the past 15 years in making passenger cars ride better—and what has contributed to this improvement—can be seen from a series of tests run on the Union Pacific.

The tests were conducted by running a special train containing both regular and dome cars through different curves at different speeds. From this the behavior of the dome car could be compared with that of the conventional car, and the speed and clearance allowances could be established by measuring the lean and the roll.

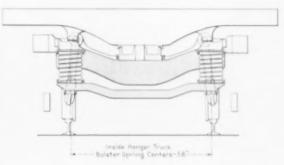
The cars compared were a lightweight sleeper built in 1941 and one of the latest dome cars delivered to the UP. Different type trucks were also compared. The dome car had the newer General Steel Castings four-wheel truck with outside swing hangers and large central bearing. The sleeper had the inside swing-hanger truck commonly used under streamline cars until a few years ago.

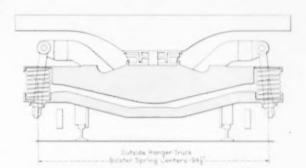
A report of these tests discloses that the dome car, despite its higher center of gravity and longer travel bolster springs, has:

- Approximately half the angle of roll of the regular car.
- 2. Two-thirds as much lean inward standing on track with 6-in, superclevation.
- 3. A little over half the lean outward when taking a curve at high speed,



Commonwealth equalized, outside swing-hanger truck used on UP cars (above) has CSC central bearing and Houde snubbers. Bolster cross sections (right) of outside and inside swing hanger trucks show how outside hangers make it possible to increase bolster spring spacing more than 3-ft.





Roll and Sway

Two types of tests were made—static by elevating the wheels at the shops, and dynamic by running through curves at various speeds. The static tests established basic data and showed how much a standing car would lean to the inside of different curves. The latter figure determines the minimum clearance condition, which occurs when a standing car on the outside track of a curve is passed by a train at maximum speed on the inside track. The static tests also measured the horizontal displacements from eave to skirt point to the center line of track, these being determined for 2, 4 and 6 in. of track elevation.

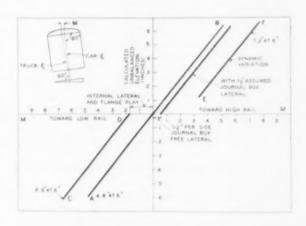
For the dynamic tests a six-car train—comprising a diesel locomotive, buffer cars, the two test cars and a business car—made a round trip from Omaha to Ogden. To facilitate observations the train was operated only in daylight.

The car body angle with respect to the vertical was measured by gyroscopes, the lateral displacements between the truck frame and bolster at each end of the test car by electric strain gages. Records were made through 52 curves selected by the district engineer, at speeds varying so that as much as 6 in. of additional elevation (6 in. unbalance) would have been required on the outer rail to obtain equilibrum (i.e., for the wheels to press on the inside and outside rails with equal force.

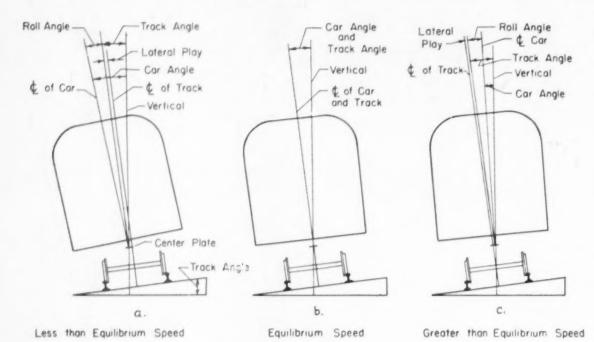
Measuring Roll and Displacement

From the dynamic tests on the curves the roll of the car body was computed by taking the difference between the angle of the car body as measured by the gyroscope and the inclination of the track. The lateral displacements of the eave and skirt points with respect to the center line of the track were calculated from the roll angle. To these displacements were added the lateral dynamic displacements between the truck frame and bolster giving total lateral displacement. Adding the roll and the total displacement gives the overall effect of the curve on clearances.

From these data the following difference was found between the transverse displacement at the eaves of the



How much the dome car leans inward or rolls outward at the cave height (132-in, above the rails) for different values of unbalance. Line AB represents the lean inward due to gravity or the lean outward due to centrifugal force. Adding the free lateral to the inward lean gives the total displacement toward the low rail as represented by line CD, which also indicates the maximum inward lean of 6.6-in, at 6-in, of unbalance. Adding the free lateral, plus the variation due to track and other irregularities, on the running tests gives the total movement due to centrifugal force. Line EF shows this total, which reaches its maximum of 7.2-in, at 6-in, of unbalance. Comparable values of displacement at points C and F for the sleeper are 9.6 and 12.3-in, respectively.



The Meaning of Unbalance

The term "inches of unbalance" or "unbalanced elevation" referred to frequently in the article can perhaps best be understood by referring to the accompanying sketches.

For any degree of curvature with a given superelevation (height of the outside rail over the inside rail), there is an "equilibrium" speed shown in the center sketch. If the curve is taken at a speed below this, the car leans toward the inside. If the car takes the curve faster, it leans toward the outside, and the faster the car goes the more it approaches the overturning speed.

The "equilibrium" speed can therefore be defined as the speed at which the wheels on one side press downward on the inside rail with the same force as those on the other side press down on the outside rail (the condition that exists on straight track). In other words, it is the speed at which the floor of the car is parallel to the top of the rails.

If a curve is taken above equilibrium speed so that 6 in. more superelevation would be required for the wheels on both sides to press equally on the rails, that is spoken of as 6 in. of unbalance.

The roll of the car body is the difference between the track angle and the car angle. At equilibrium speed the ear angle is equal to the track angle, and the angle of roll is zero. The roll angle is inward, or negative below this balance speed — outward, or positive, above it. Below equilibrium speed, the car angle is equal to the track angle plus the roll angle. Above equilibrium speed, the car angle is equal to the track angle minus the roll angle.

Thus one effect of the roll is to partially neutralize the superclevation, or banking, of the curve in counteracting the centrifugal force on the passenger. A second major effect is on clearance which is determined by the roll plus car width, overhang at both ends and center and lateral movement of body relative to track. This lateral movement is indicated by the displacement of the center plate in the two end drawings. It adds to the total effect of the curve either below or above equilibrium speed.

two cars at 6-in, unbalanced elevation for the static and dynamic tests:

	Static lean inward,	Dynamic lean outward
	in.	in.
New dome car	6.60	7.20
1941 sleeper	9.60	12.30

Thus the static lean inward of the dome car is only some two-thirds that of the sleeper, while the dynamic lean outward is a little over half as much. Adding the inward and outward leans together gives a total of 13.8 in. for the dome car vs 21.9 in. for the sleeper. Translated into clearances, the occupied space of a dome car

standing on a 6-in. elevation curve being passed by one moving at 6 in. of unbalance will be approximately 8 in. less than that of a pair of sleepers for the same conditions.

Roll measurements for 6 in. unbalance showed the angle to be 1 deg 45 min for the dome car and 3 deg 38 min for the sleeper. The roll in both cases was also found to vary directly with the increase in track elevation. The better behavior of the dome car under all conditions, despite its longer travel bolster springs and higher center of gravity, is attributed to the use of the outside swing hanger, wide bolster spring base truck and the stiffer equalizer springs.

Super Railroads—What, How and When?

NEW BOOK: "Super Railroads for a Dynamic American Economy." by John W. Barriger. Published by Simmons-Boardman Publishing Corporation, 30 Church Street, New York 7. Bound in strong paper. PRICES: Single Copy, \$2; 10 copies, \$17.50—postpaid. Further reductions on larger quantities, ranging down to \$1 a copy (f.o.b.) for 200 copies or more.

The book is in essence a job of stock-taking. It deals with tangible things—plant, equipment, methods—not with theories. It assays railroad plant and performance, the good with the bad; and then, still adhering to tangible data, indicates the most likely path to great improvement.

Here today is the railroad industry, doing on the whole a creditable job of hauling half (but a declining ratio) of the nation's freight traffic. Railroad efficiency has been greatly improved in the years since the war.

Super-railroads will come into existence to the degree that steps are taken to make a larger and larger ratio of railroad plant and practice as good as the best of them already are.

Such super-railroads would benefit everybody. Shippers and consumers would get lower transportation costs. Additional traffic, drawn to the railroads by improved service and attractive rates, would bring greatly increased earnings. Better earnings would induce the new investment needed for further improvements to plant and equipment.

It is evident that the unused capacity of the American railroads is a figure of astronomical size. This unusual capacity represents colossal economic waste—as harmful to the public interest as it is to that of the railroads. As the author points out, it is capacity and not use that occasions a very large part of railroad expense.

In his critical scrutiny of railroad plant and equipment, the author is at his best. He takes up railroad property class by class and indicates what is needed to bring the whole plant up to acceptable modern standards, viz., grade and curvature, roadway and track; bridges and tunnels (not many big new bridges needed, but a lot of tunnels); signals and communications and track patterns; terminal modernization (with real estate development to provide much of the needed financing); locomotives, cars, and shops; miscellaneous facilities. Here are a few of his more pointed observations:

"Diesel operation made obsolete the yards, train schedules and frequencies, and schemes of 'prior classification' which were built up around steam operation. Similarly, the diesels made obsolete the track arrangements of most passenger terminals and stations.

"Diesel motive power has made the 'hot box' a critical problem. The friction journal bearing must be made more dependable or else the roller bearing must be substituted for it. There are 16 million journal bearings on the freight cars moving over the American railways. 'Hot-boxes', even if they occur in inconsiderable proportion to total car-mileage, still constitute a great many car failures in line. All such failures on line are expensive and some prove to be dangerous.

"The carriers no longer have to rebuild their railroads to accommodate engines of 6,000 horsepower. Diesels, for the first time, equalized the bridge, clearance, and track requirements of super-power locomotives with the standards necessary for the cars being pulled. With diesels, track standards which will accommodate the cars will also accommodate the locomotives of the maximum horsepower needed to haul them.

"However, the superiority of diesel operation under any set of fixed conditions should not obscure the further advantages which improved grades and curves will give the new motive power. Diesels do not lessen the force of gravity or the resistances of curves and journal bearings.

"The decline in passenger traffic is one of the railroads' principal problems

"Recovery of freight traffic through super-railroads could easily make railway passenger service (in coaches) cheaper and faster than travel by highway between all principal cities."

Aside from improved physical facilities, the author believes the railroads have a long way to go in improving the quality of both their freight and passenger service. The principal handicap to such improvement, he believes, is the railroads' failure thus far to provide current quantitative checks on performance which will enable management to maintain constant scrutiny of the quality of service. Rapid data processing is essential for this.

All in all, John Barriger has provided a convenient body of information and inspiration, which if widely read in the railroad industry, could easily banish all inclinations to defeatism and set the sights for the industry's progress upward and onward.

"Curtailment of maintenance, except under circumstances arising from engineering conditions permitting it, represents a deferment of expense, not an avoidance of it. If the resultant 'debt to the plant' is not repaid with equivalent work later on, a temporary 'involuntary' loan has been made on the property."



ELECTRICAL SECTION .

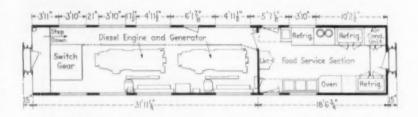


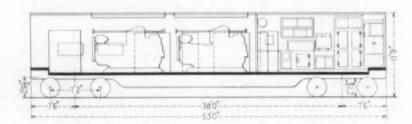
The "Pennsy Keystone" Does Everything Electrically

Pennsylvania's new Budd-built tubular uses electric energy for all train services and can be hauled by either an electric or diesel-electric locomotive.

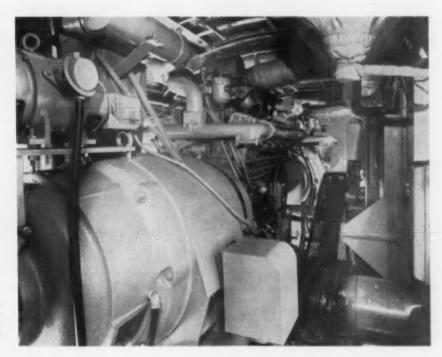
At right: Power car has carbon steel underframe incorporating 600-gallon fuel tank. Uninsulated stainless body construction houses generating and food service equipment for the entire train. This 112,000-lb unit does not utilize depressed floor between the trucks, which are the same swing-hanger, equalized type as used on coaches.

On facing page: Coach has carbon steel end underframe units which transmit the buffing loads to stainless side sill construction around depressed floor section. Cars have 5-in, x 9-in, roller bearings and large central bearings. Water tanks are series of 8-in, tubes in protected casing under depressed floor. Cars have HSC brake equipment with no provision for electro-pneumatic control.





Fower car and coaches of the "Keystone" (on facing page) are conventional Budd design — corrugated and fluted sheathing of stainless steel, and Shotweld assembly. It is about two-ft lower than standard AAR profile. Cars have tightlock couplers at standard height; can be handled in trains with present equipment.



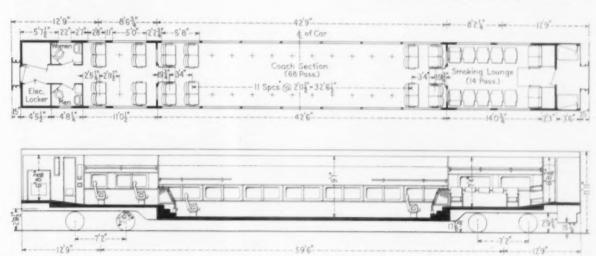
At right: Power car engine room contains the two diesel-alternator sets supplying power for all train services. Radiators are mounted in car's sidewall.

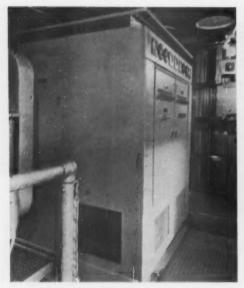
WHEN THE PENNSYLVANIA'S "TUBULAR" lightweight train is hauled by one of the road's type GG1 electric locomotives, it is capable of meeting any practicable operating schedule. This stainless steel train-Budd's first entry in the current low-slung, cost-cutting coach competition-can also be hauled by any type, or number of diesel-electric units. Electric power for all train services, including heating, cooking, air conditioning, lighting and battery charging, is developed by two diesel-generator sets in a 53-ft power car, and transmitted to seven 85-ft coaches by 3-phase, 440-volt trainlines. Each of the coaches has a seating capacity of 82 passengers, and weighs 93,000 lb. The weight of the power car is 112,000 lb. Since the floor of each car is depressed below the level of the platforms, space under the floor is not available for batteries, air conditioning units, etc. The center of gravity of the cars is about 45 inches above the rail.

Train Power Supply

Electric power is generated in the power car by two Cummins-Westinghouse 265-kw, 440-volt, 3-phase, 60-cycle, diesel engine-generator sets. They are located in the forward 32-ft compartment or engine room. The engines are started manually by means of a 426 amp-hr, 16-cell, Gould battery, carried in conventional battery boxes under the car, which is charged by a 40-amp constant potential rectifier.

Switchgear cubicles located in the engine room include the following: two three-pole circuit breakers for generator protection; a three-pole trainline circuit breaker; engine starting and synchronizing controls; a battery circuit breaker; line voltmeters and ammeters; two frequency meters; two elapsed time meters; a ground detector alarm; two interlocked, three-pole standby power transfer contactors; an emergency lighting circuit relay;





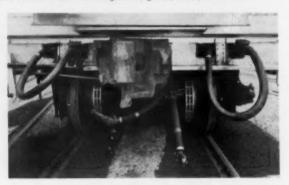
In the power car-the main distribution switchgear . . .



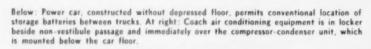
and food service section which has refrigerators, grilles, ovens, coffee urns.



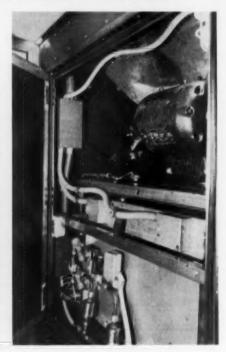
Power jumpers between cars join the four parallel three-phase circuits which supply electric power through the train.



At each end of each car the two power jumpers can be plugged into the vacant receptacle when car is the end of the train.







64

Depressed coach section and both upper levels are illuminated by twelve 18-in, square lighting fixtures employing circline fluorescent tubes. Entire interior of car is lined with backed and unbacked ½-in. Micarta plastic. Integral color of this material makes painting unnecessary and simplifies cleaning. Floor covering is rubber tile with contrasting colors used on ramps and stairs. Double-glazed windows have roller curtains. Fiberglas is used for thermal insulation, and cement sprayed on floor and lower side wall construction acts to deaden roadbed sounds.

Lower left: Battery boxes, located just inboard of the vestibule step on each coach, supply power for incandescent and emergency lights, and heating and cooling controls.

Lower right: Coaches are heated by strip-type resistance units behind stainless grilles along the floor at side wall.







two generator regulators; three de-ion circuit breakers for the food service section; a branch circuit breaker for the engine generator compartment lights. There are also six transformers—three 15 kva, single-phase 440/220-volt and three 1.5 kva, single-phase 220/110-volt—to serve the food service section.

The rear section of the power car, 18 ft 6 in. long, is used for preparing food for the train. In this section, 440-volt power is used for heating only. Power at 220 volts is used for a 3-ton air conditioning unit, a 3-kw space heater, 3 refrigerators, oven, grilles, coffee maker, deep wells, sink and a hot water heater. Exhaust fans, anti-freeze heaters and lights operate from the 110-volt circuit, and emergency lights from the 32-volt battery.

Trainline

The power trainline consists of 12 General Electric 3/0 cables arranged as 4 parallel 3-phase circuits with 3 No. 12 wires for trainline control. There are two six-pole receptacles having three contacts for control wires, and

two permanent six-wire jumpers, with a six-point plug on the free end, at each end of each car. At the rear end of the last car in a train, the jumper plugs are inserted into the receptacles to complete the control circuits, permitting the mainline circuit breakers in the power car to close. Control points in the connectors are shorter than the power points, so that when a plug is pulled from a receptacle, the breaking of the control circuit will open the breakers in the power car, before the power contacts in the connectors open.

There are two 220-volt, 3-phase standby power receptacles on each car. This power can be used for onehalf of the overhead heating, lights, battery charging and anti-freeze protection. Transfer from head-end power to standby is obtained through two, 3-pole transfer contactors which are mechanically and electrically interlocked.

Trainline cables are run under the car floors and are not enclosed in conduit. Main wiring for each car under the floor is carried in heavy rigid threaded galvanized conduit except for flexible connections to equipment and



All-electric, from end to end, "Keystone" is now in service on the New York-Washington run behind Pennsy GG1 locomotives.

battery trays and for power trainline cables. Wiring inside the car is carried in thinwall conduit or chases.

Heating and Air Conditioning

Each 82-passenger coach has its own 8-ton capacity Frigidaire, electro-mechanical air conditioning system, operating on direct expansion principle with freon as a refrigerant. The compressor-condenser unit is mounted beneath the floor between the truck and end of car atthe non-platform end of the car. The air conditioning unit is of the floor mounted type, located in a locker at the same end of the car. The conditioned air is distributed uniformly through a center ceiling duct, and is discharged into the coach section and smoking lounge section through continuous flush type distributors, one on each side of the center-line of the car. Viscous impingement filters are installed in both the outside and recirculated air streams. Vitiated air is exhausted from the car by means of two propeller type fans, one for exhausting air from the smoking lounge and the second from the washrooms and electric locker.

The car is heated electrically by means of vapor strip heaters, of which 20.8 kw is located in heater boxes along the floor at the side walls. Strip heaters of 25.5 kw are also mounted near the evaporator unit to provide the requisite overhead heat.

The vapor temperature control panel is arranged for automatic changeover from heating to cooling. The temperature selector switch has three positions, ON-DAY, OFF and ON-NIGHT.

The coils of all car contactors and relays, except supervisory control and transfer switches, are arranged for operation on nominal 32-volts, d-c.

In each car, an emergency switch is placed in series with supervisory control circuit to trim the electric heating load in all cars to one-third, if the train is stopped in a confined area.

The air conditioning compressor is a four-cylinder, slow-speed unit, arranged for modulation by cylinder unloading. The compressor is belted to a 15-hp, 440-volt, 3-phase, 60-cycle, 1,695-rpm squirrel cage, induction motor having permanently lubricated sealed bearings.

The condenser is of the dry type, air-cooled by means of two fans, each driven by a ³/₄-hp, 440-volt, 3-phase, 60-cycle, 1,725-rpm squirrel-cage, induction motor having permanently lubricated sealed bearings.

The evaporator is of the extended surface type having copper tubes and copper fins. The coil assembly is split for modulated control.

The centrifugal blower is designed to deliver 2,400 cfm, of which 800 cfm is outside air, at a static head of 1.1 in. It is belt-connected to a 1-hp, 440-volt, 3-phase, 60-cycle, 1,725-rpm motor having permanently lubricated sealed bearings.

An electric radiator consisting of space type heaters 25.5-kw, 440-volt, 3-phase, 60-cycle is included as the overhead heating unit.

There are two exhaust fans, each 10 in. in diameter, propeller type, driven by a 1/30-hp, 110-volt, single-phase, 60-cycle, 1,500-rpm motor.

During the cooling cycle, the compressor runs continuously and the compressor capacity is varied thermostatically by unloading and loading cylinders to produce the desired degree of modulation, and simultaneously the active surface of the evaporator is varied by a solenoid valve in the liquid line, which in effect sectionalizes the evaporator. When the temperature in the car reaches the low point on the thermostat, the compressor is shut down. A high-low pressure cut-out is provided to stop the compressor in the event of high head pressure; also to stop the compressor in the event of low pressure.

There are two thermostats, one for heating and the other for cooling. Each of these is of the double bulb type, having two control points, separated by 2 deg F. There is an outside selector thermostat used to prevent the operation of the cooling apparatus when the outside ambient air temperature is below 40 deg F. When cooling is required, and the outside temperature is above 40 deg F and the cooling pilot is closed, the electric heat is locked out.

There is an overhead protective thermostat set to cut off the overhead heaters at 350 deg F, in the event of a blower motor failure.

The floor heat is comprised of single strip heaters, and both the floor and overhead strip heaters are controlled through a switching arrangement, to give full heat when connected delta, and approximately one-third heat when connected wye.

When the temperature selector switch is set in either the ON-DAY or ON-NIGHT position, and the outside temperature is below 40 deg F, full floor and full overhead heat will come on, when the car temperature falls below the thermostat control point. As the car temperature rises, the

thermostat functions to reduce the floor and overnead heat to one-third heat. Further rise in car temperature beyond the high point of the thermostat causes all heat to be shut off. The electric heat will then cyle according to the heating requirements of the car.

Both of the 265-kw, 480-volt, 3-phase, 60-cycle diesel engine-driven alternators in the power car are needed to supply full heating load for all the cars in the train. A master supervisory control relay is included in the power car to trim the heating load, close the outside air damper, and shut off the exhaust fans, in the event of the failure of one of the alternator sets, due either to engine or electrical faults. A supervisory control trainline is provided, as well as a supervisory control relay in each coach. The supervisory control trainline is energized when both alternator sets are operating and all supervisory control relays in the train are energized, permitting full heat in each car if required. However, when one alternator is shut down, this trainline is de-energized and the supervisory control relays in the cars are de-energized and only one-third heat is available. As mentioned above, in the event of an alternator failure, the supervisory relay in each car functions to close the outside air damper, and thereby reduce the heating load.

When the car is on 220-volt, 3-phase, 60-cycle standby service, an auxiliary function of the load transfer relay is to close the outside air damper and shut off the exhaust fans on both heating and cooling, and it also functions to limit the heating to one-third to prevent overloading the wayside power supply.

Anti-freeze protection for drains and service water tanks is set to come on when the outside temperature drops to 35 deg F.

Wash water is heated by individual 1-kw instantaneous immersion heaters in each washroom. These are thermo-

statically controlled to hold the desired temperature of wash water.

General lighting is operated from 110-volt a-c power. In each passenger car, the lighting is supplied by 12, 18-in. square Safety lighting fixtures in each of which there are two concentric circline fluorescent tubes. The units, which have plastic shades, are spaced evenly along the center line of the ceiling. Lighting intensity on the reading plane is approximately 14 footcandles. A capacitor maintains a power factor of about 90 per cent on the lighting load.

Incandescent lighting fixtures are used in the men's and women's washrooms and in the vestibules,

Light sources for illuminated plastic handrails are incandescent bulbs, located within the confines of the first step tread and riser.

There are a total of five 25-watt emergency lights in the ceiling of each coach section and smoking lounge, operating on 32 volts d-c, and there are 15-watt lights in the vestibule and washroom fixtures. These lights go on automatically in case of power failure or separation from the head end power car. The 32-volt power supply for the emergency lights is guaranteed by an Edison 25-cell, B-4-H, 75 amp-hr battery, arranged in two boxes on each car. The battery is kept charged by a 10-amp rectifier.

If a train is stopped in a tunnel for longer than five minutes, a switch and pilot light, located in the switch locker of each car, permit manually limiting the floor heat in all coaches to the star arrangement (½ capacity or 7 kw per car), and permitting full overhead heat (25.5 kw). This simulates the loss of one engine restriction which reduces engine load to approximately one half and reduces toxic fumes from engine exhaust to a minimum.

Resistance Commutator Soldering

A SATISFACTORY MEANS of soldering traction motor armatures by means of heat developed between a carbon tip and the commutator riser has been worked out in the Milwaukee, Wis. shops of the Chicago, Milwaukee, St. Paul and Pacific. A current of 350 to 400 amp is produced from a brazing transformer and the heat for soldering is the I'R of the current in the contact and carbon resistances.

One terminal of the brazing transformer consists of a steel clamp, holding a piece of 1-in. x \(^3\)\(^4\)-in. x \(^6\) in. No. 580 grade carbon against a commutator bar. The edge of the carbon is in contact with the bar for a distance of about one inch close to the riser. The other terminal of the transformer consists of a second piece of No. 580 carbon of the same dimensions in a steel clamp and handle, held against the riser, as shown in the illustration. A foot switch closes and opens the transformer primary.

About 15 seconds are required to bring the riser to soldering temperature, and one bar is soldered at a time, with string solder applied as shown. The carbon in the hand-held clamp is advanced as it burns away, being used down to a length of about 4 in. and one carbon will solder about 3 armatures. The heat may be



Only 15 seconds are required to bring the riser to soldering temperature

controlled accurately, and the procedure is also satisfactory for the removal of coil ends. The same type of device is used for generators.

Locomotive Maintenance All the Way or All at Once?

By Guy Franklin

FAILURE TO PLAN proper diesel locomotive maintenance can create a grade that locomotives cannot climb. This point is well illustrated by an incident which happened several years ago.

It had become necessary to build a branch line railroad from our main line to serve an important government project. The branch line was to connect with the main line at River Valley and extend some 30 miles into the hills, to a point called Hillview.

A party was sent out to make a location survey for the new right of way. It was the young engineers' first experience in the work of locating a right of way through new country. They proceeded in what they thought to be a wonderful location. Finally, they struck an obstacle that brought their work to a stop. They then called for help, and the chief engineer responded to the call.

It did not take him long to see what was wrong and he made a re-survey that in a short time solved the problem. When he was asked what was wrong with the original survey, he explained as follows. The young engineers failed to understand their problem, which called for connecting a point at River Valley with a point up in the hill country.

Starting in the valley, they chose the route with the easiest grade line and held to that plan as they proceeded. Finally, as they drew closer to the hill terminus, they could see they were going to have to gain all of their altitude in the last few miles. This meant they would have a grade that was completely unsurmountable.

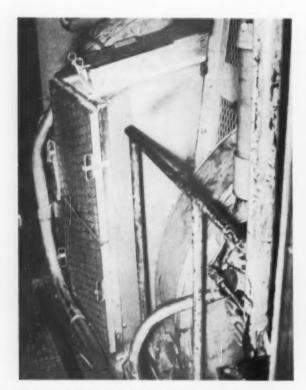
In other words, the survey party failed to develop their grade over the entire course of the route. The temptation to take an easy course at the start had simply betrayed them, and only postponed the time when they would eventually have to climb enough to reach the hill top. When they finally reached a point where they were faced with an unsurmountable grade, they called for help.

Fortunately the engineers discovered their mistake before construction work started and corrective measures could be taken before it was too late.

It is the same with locomotive maintenance. Unless the planner can visualize and plan for all the hills and peaks that have to be surmounted in the service life of a fleet of locomotives, he may eventually have to face a grade that cannot be climbed except at unwarranted expense.

Unless the maintenance plan starts developing the grade as it progresses, the program may face an unsurmountable grade, and that will be too bad. It will be too late to make a re-survey as did the location survey group.

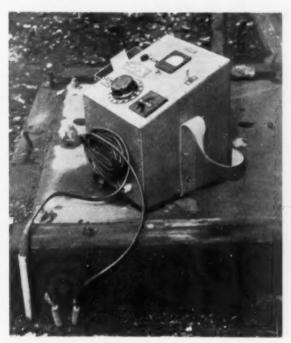
Does your maintenance plan develop the grade as it progresses over the entire course?



CLEAN AIR FOR MOTORS AND GENERATORS. Filtering the air used for cooling electrical equipment on diesel locomotives is becoming increasingly popular. Rotating equipment is kept much



cleaner and brush life is lengthened. The New York Central has installed filters on Westinghouse main generators (left) and also used filters over the air intakes of traction motor blowers (right).



The instrument can develop d-c voltages up to 2,000 volts with superimposed surges which make tracing easy.



Two-stage amplifier and head set used to trace underground cable to the point of fault.

Instrument Finds Grounds in Cables

An INSTRUMENT designed primarily for locating grounds in buried non-ferrous cables has been developed in the Milwaukee, Wis., shops of the Chicago, Milwaukee, St. Paul & Pacific. The device breaks down the insulation at the point of ground and then applies electric impulses to the cable which can be traced along the surface of the earth to the point of the fault.

Shown in one of the illustrations, connected to a grounded pipe and to a cable under test, the instrument operates from 115 volts a-c and develops d-c voltages up to 2,000. A transformer raises the primary voltage and the secondary output is rectified to d-c by one rectifier 866A tube. Voltage is controlled by a Variac in the transformer primary and there is also a circuit breaker in the primary circuit, which will trip at 4½ amp.

There is a condenser of 2 mf capacity in parallel with the secondary and there is a motor-driven clock which may be used to open and close a switch in the secondary circuit at two-second intervals. The capacitor is on the transformer side of the clock-operated switch.

To make a test, voltage is applied to the cable and the cable insulation is broken down at the fault. The clock-operated switch is used to send surges from the condenser discharge through the fault.

The fault is located by means of a portable detector which consists of a two-stage audio amplifier with a 500-ohm coreless pick-up coil and a telephone head set. It is operated from a 90-volt plate and a 1½-volt filament battery. It is used as shown in service in one of the illustrations to trace the cable to the point of the fault.



Detector being used to trace the underground cable

The electrician, shown with the detector, devised and built the instrument.



PROBLEM PAGE . . .



WHERE THE TOUGH ONES ARE HANDLED

Hard-Riding Passenger Cars

When a passenger car is reported as a "hard rider," what is checked, and in what order is this work done? What are the most frequent causes of poor riding?

(Discussion continued from the April issue)

WESTERN RAILROAD'S PROCEDURE. The following course of action is recommended as generally successful by one of the largest western railroads.

When a car is reported "hard riding," a close inspection is made of the truck before car or trucks are disturbed and the following conditions are noted:

- · Position of journal boxes in pedestals
- · Condition of springs while under load
- · Position and condition of side bearings
- · Position of bolsters
- · Condition of wear plates
- Condition of wheels, brake rigging and associated parts.

Any abnormal condition of these items can contribute to rough riding. In cases which are known "repeaters," a district car department supervisor rides the car in service and furnishes the repair point with information as to what is needed to correct the condition.

Trucks are removed from under the car and wheels are checked for defects such as tread wear, double flanging, flat spots, shelled-out or built-up tread. Side bearings are checked for proper clearance and condition. Truck bolsters are checked to make sure they are not shimmed too high which causes them to strike against the truck frame while the car is in motion, and they are checked to see that they are properly positioned in the truck. All truck springs are inspected for weakness and proper riding height. Center plates are examined to see that they are properly secured, lubricated, and that there is no binding action.

Journal boxes are checked to make sure they are riding properly within the pedestals and not binding, tilting, or setting low enough to strike the bottom tie bars while the car is in motion. Roller bearing boxes are checked for proper clearance between the pedestal lug liner and the pedestal, and free lateral bearings are examined to make sure that internal lateral is kept within limits. The condition of shock absorbers and bolster anchors is observed and necessary adjustments made. Spicer generator drives are checked for any possible defects which may cause misalignment and vibration.

The order in which this work is done generally is as follows: Wheels are inspected first; then the side bearing conditions are noted; journal boxes are checked; equalizers, bolsters and truck frames are inspected; then truck springs, shock absorbers, center plates and finally the Spicer drives.

The most frequent causes of "hard riding" trucks are worn and double-flanged wheels, worn pedestal liners, worn journal boxes and liners, weak and broken springs, improper adjustment of equalizers, improperly adjusted side bearings, and worn center and wearing plates.

Do Diesels Start Fires?

Can the responsibility for track-side fires ever be laid to diesel-electric locomotives?

(Discussion continued from the June issue)

New York's Experience by W. M. Foss, Director, Lands and Forests, State of New York.—In New York State we have been disturbed over fire occurrence associated with the operation of diesel locomotives. Following the initial changeover from steam to diesel power, we felt that the diesels had solved the fire problem in New York State. During the second year of operation, however, we began to receive reports of fires caused by diesel locomotives. Frankly, we were somewhat skeptical.

An investigation of the occurrence of several of those fires indicated that the cause of the fire in each instance did not originate with the power unit. I believe in one case it was loss of oil which was ignited by hot brake shoes.

Our Senior Locomotive Inspector attended a series of meetings in the West, conducted by the manufacturers of diesel power, and at that series of meetings the manufacturers claimed that diesels could not start fires. The following year they had somewhat changed their position and admitted that diesels were starting fires, but fires were being caused by a few number of locomotives. They agreed to design effective spark arresters for any operating company that requested their help. They attributed much of the difficulty to the adoption of detergent oils which they claimed freed the carbon in the cylinders, which was emitted at sufficiently high temperatures to cause fires. The following year they did not endeavor to alibi diesel locomotives. A summary of those three meetings just about pictures the progressive difficulties we have been having with diesel power.

In the case of one railroad, an investigation of fires caused by diesels produced the following conclusions:

 That fires are a direct result of carbonaceous deposits which break away from the exhaust chamber of the cylinder head in a burning state. These particles continue to burn until they reach the ground.

The engine reaches some temperature and/or status where the head deposits let go suddenly. This has resulted in an eruption of sparks which occur in a "Fourth of

(Continued on page 80)



The Wine Railway method of applying torsion springing in combination with trunnion hinges has proved a faster, more economical and a safer way to close drop end gondolas. Because the torsion action is greatest when the load is the heaviest, there is no need for a crew of four or five men to close even the largest drop ends.

Used in conjunction with Wine Drop End Locks for positive closure, these two devices provide combined benefits for both the owners and the users of the equipment. To date, 7,136 gondola cars on 22 different roads have been equipped with this combination. Write for bulletins containing additional information.

THE WINE RAILWAY APPLIANCE COMPANY . TOLEDO 9, OHIO





The big railroad switch -and all America

53 RAILROADS and private car owners have now gone "Roller Freight" to improve service!

16,959 FREIGHT CARS equipped with Timken tapered roller bearings are already in use or on order! ORDERS IN 1955 exceeded the previous 4 years combined!

OVER ONE-FOURTH THE CARS recently ordered by railroads will be shared by non-owner lines

THE biggest event in railroading is the way "Roller Freight" is

suddenly catching on.

For years, it's been gaining ground, bit by bit. Now the big switch has started. In 1955, the railroads ordered more freight cars equipped with Timken[®] tapered roller bearings than in the previous 4 years combined!

On top of this, over one-fourth of these cars will be shared by their

owners with all other railroads. Since 1948, the number of rail-

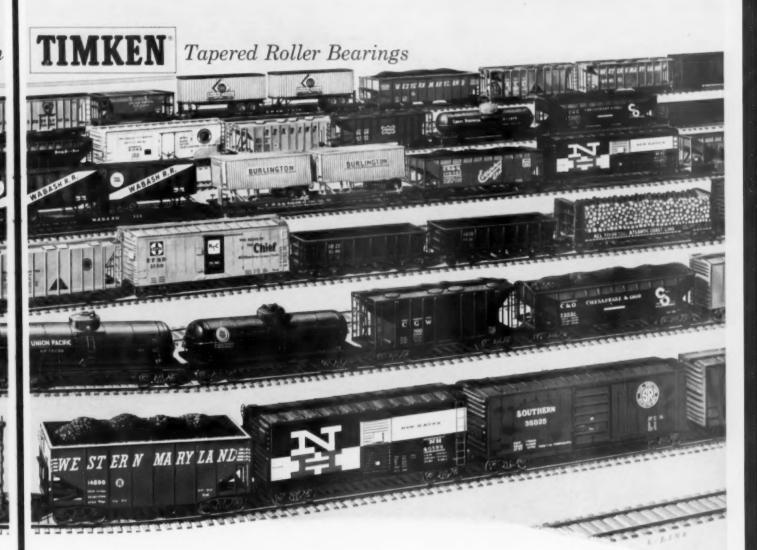
roads and private car owners owning "Roller Freight" cars has grown from 12 to 53. "Roller Freight" cars have multiplied from 627 to 16,959. In 1955 alone, 6,441 cars were ordered.

Up to now, the railroads have confined the use of "Roller Freight" cars to owner lines, where they could accurately study the advantages of "Roller Freight". Important operating economies and improve-ments in service have been revealed, largely through the reduction of hot

boxes and inspection costs. This has caused the railroads to accelerate their switch to "Roller Freight" with over one-fourth the cars on order earmarked for interchange service.

These interchange cars won't

Only TIMKEN bearings roll so



to "Roller Freight" is on will benefit

spend all their time on their home lines so the roads owning them won't enjoy their full benefit. But the potential benefits of "Roller Freight" are so great that these roads are hastening the day when all freights are on roller bearings. Then all railroads will enjoy the full benefits of "Roller Freight" together. America will have one answer to the freight car shortage.

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Traditionally, freight cars have been dependent on friction-type bearings or "brasses". These frequently fail, despite an annual expenditure of \$135 million in inspection and maintenance to keep

them operating. Hot boxes result, the biggest cause of freight train

Timken tapered roller bearings eliminate the hot box problem. They don't slide the load. They roll it. Their tapered design ends lubrication problems and the need for frequent journal box inspection. Terminal bearing inspection time is cut 90%, lubricant cost as much as 89%.

90%, lubricant cost as much as 84%. All America benefits from "Roller Freight". And "Roller Freight" is on the way! The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "Timrosco".

"ROLLER FREIGHT" ROLL CALL

Railroads having 20 or more freight cars on Timken hearings

on Timker
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& Youngstown
Alaaka Itailroad
Atchison, Topeka
& Santa Fe
Atlantic
Coast Line
Baltimore & Ohio
Boston and Maine
Chesapeake
& Ohio
Chicago,

& Ohio Chicago, Burlington & Quincy Chicago Great Western Duluth, Missabe & Iron Range Erie

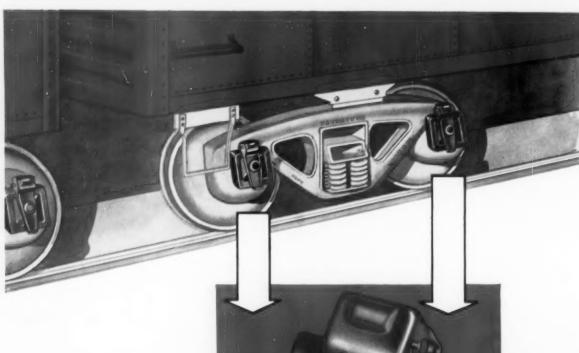
Louisiana and Arkansas Nickel Plate Road New Haven Northern Pacific Pennsylvanis

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true, have such quality thru-&-thru



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Easiest of all lids to install or remove . . . no tools

Millions of Motor Wheel lids now in use are giving dependable service.



STANDARD MODEL

Motor Wheel Corporation





QUESTIONS and ANSWERS

6-SL Brake Equipment

This series of Questions and Answers pertains to the 5-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of In-struction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

(Inst. 5046-15, Page 36. Plate 1)

W134-Q-How does main reservoir air flow through the system in release position?

A-Air flows through the dirt collector in the main reservoir pipe to the brake valve and to the distributing

W135-Q-Describe the main reservoir air flow through the

brake valve in release position. A—Entering the brake valve through port 7, main reservoir air flows through passage 7 to chamber A above the rotary valve, through rotary valve port (not shown) and la and l to the brake pipe, charging the system.

W136-Q-What other connections are made at the brake

valve in release position. A—Port j in rotary valve registers with equalizing port C in the valve seat, permitting air at main reservoir pressure to enter chamber D above equalizing piston 41, and the equalizing reservoir.

W137-Q-Describe the flow of air after leaving the brake valve in release position.

A—The equalizing piston chamber P in the 6-KR distributing valve is connected to the brake pipe. Brake pipe air flows through feed groove v past piston 26 into the chamber surrounding equalizing slide valve 31, and through port o to the pressure chamber until the pressure is equal on both sides of the piston.

W138-Q-What would be the result if the brake valve handle was kept in release position? A.—The brake system would be charged to main re-

servoir pressure.

W139-Q-To avoid this overcharge, what must be done? A—The handle must be moved to Running position.

W140-Q-What serves as a reminder to the engineman? A-An arrangement of ports connects feed valve air to the exhaust. The noise of escaping air is sufficient to attract the engineman's attention.

W141-Q—What are the rotary valve connections when charging in running position?

A-Cavity r in the automatic rotary valve connects port 20 to port Ia in the seat, providing a large direct passage from the feed valve to the brake pipe.

W142-Q-What other connection is made from port Ia? A-From port la air also flows through cavity i and port C to chamber D above the equalizing piston. Chamber D is connected through port 5 and pipe connection to the equalizing reservoir and the gage.

W143-Q-How does air flow to the underside of the equalizing piston?

A—Port 1a has a branch v, which leads to the under-

side of the equalizing piston.

W144-Q-Is the same air pressure on both sides of the piston? A—Yes, whatever the feed valve is set for (70, 80 or

110 lbs).

W145-Q—In running position with brake pipe and equaliz-ing reservoir pressure equal, what is the position of the equalizing piston? A-Down, holding the equalizing discharge valve seated.

W146-Q—Explain the reason, that, with pressures above and below the piston equal, the piston is held in its downward piston.

-The pressure in chamber D above the piston acts on the entire area of the piston head, while brake pipe pressure beneath acts on the piston head area minus the area occupied by the piston stem,

(Inst. 5046-15, Page 37)

W147-Q-How does brake pipe air flow, after leaving the

A—Air enters the brake pipe at pedestal connection 1, flows through this pipe and the branch pipe to the brake pipe connection of the distributing valve and thence as described under release position,

W148-Q-How is the application chamber connected at

this time? A—To Ex, in the brake valve through port w, cavity kin equalizing slide valve, port i and the distributing valve release pipe to connection 4 in the brake valve pedestal, through port 4, past independent exhaust valve 134, port 19 and cavity q.

W149-Q-How is the brake cylinder pipe connected at this

A-To the distributing valve exhaust through ports c. d and e.

Service Application Plate 2

W150-Q-With the system charged, what port is opened to atmosphere when the automatic brake valve handle is moved to Service position? A-Port e, the preliminary exhaust port.

W151-Q—With this port open, what air pressure is connected to atmosphere? A Equalizing reservoir pressure.

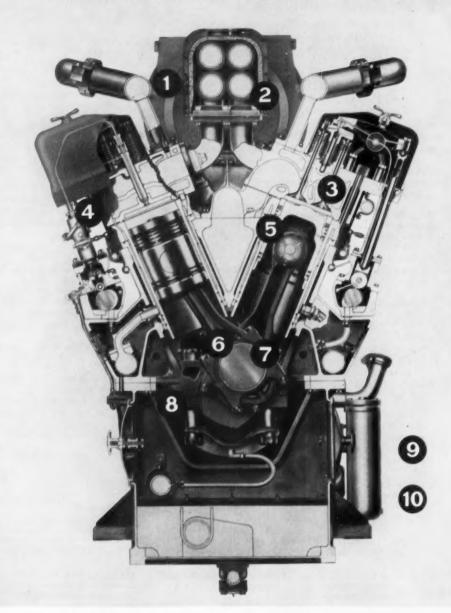
W152-Q—Explain how this connection is made. A—Air from chamber D above equalizing piston (which is connected to the equalizing reservoir) escapes through port e in the rotary valve seat, cavity q in rotary valve seat and exhaust port to atmosphere.

W153-Q-What is accomplished by this reduction?

A-This immediately reduces the pressure of the air on top of the equalizing piston 41 to less than that in the brake pipe under the piston.

(Continued on page 78)

NEW PERFORMANCE WITH





Here are a few ALCo modernizations - most are available in kit form for application to the ALCO 244. Items which are normally accomplished by Factory Rebuild Service are starred.

- ALCO water-cooled turbocharger more efficient, responds rapidly to changes in speed and load, easy to maintain.
- Ni-Resist exhaust manifold reduces casting growth and failures.
- Cylinder heads strengthened with additional metal to distribute stress more uniformly, makes possible use of valveseat inserts.
- High-pressure fuel injection with snubber *Hardened, chrome-plated crankshaft. velve - more complete fuel combustion, lube-oil condition improved, line erosion reduced.
- Ni-Resist insert pistons top ring-groove wear reduced, increases ring mileage.
- Grooveless and partially grooved engine bearings - oil-film thickness and load-carrying capacity increased.
- *Serrated cylinder block -eliminates fret-ting at joint surface of saddle and cap, prevents distortion and misalignment.
- Oil-both filter-maintains high efficiency over 94 per cent, reduced filter main-tenance, reduces engine wear.
 - Simplified amplidyne control system—fewer parts in system with simpler circuits, maintenance reduced.

MODERNIZATION PARTS AND FACTORY REBUILD

Long-service ALCO locomotives can be modernized in railroad's shops or at ALCO's plant

Design improvements in ALCO 244 diesel engines, and locomotive chassis and equipment can add new efficiency in performance and help lower maintenance costs on long-service ALCO locomotives. These improvements are available to railroads in two ways:

Modernization parts are furnished in kits with complete instructions for application. Work is accomplished in railroad's own shops. Modernization kits are readily available from ALCO's regional warehouses. Factory Rebuild Service applies modernization parts to 244 engines in ALCO's plant, also accomplishes chassis and equipment improvement. ALCO's extensive investment in machinery and rebuild methods permits operations such as saddle serration, crankshaft chromeplating, at moderate cost, and returns a completely remanufactured engine to the railroad.

Complete information is available at ALCO's sales offices. Or, if you wish, write P. O. Box 1065, Schenectady 1, New York.



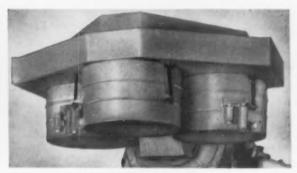
ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities



Long-service locomotives are rebuilt in ALCO plant. Railroads choose complete Factory Rebuild Service for upgrading locomotives. Work includes all engine rebuild and modernization, as well as chassis rebuild and improvements. ALCO returns locomotives up to present specifications for service.



Many reilroads have applied ALCO modernization parts to older units during regular overhaul schedules. The results have demonstrated better performance, improved efficiency and lower operating costs, Kitx such as oil-bath filter modernization are readily available.

QUESTIONS and ANSWERS

W154-Q-What action then takes place?

A-The higher pressure moves the piston upward raising the attached equalizing discharge valve from its seat.

W155-Q-What flow of air results when the equalizing discharge valve is unseated?

A-Brake pipe air flows through opening m, past the valve, and through passage n and service exhaust fitting to atmosphere.

W156-Q-What then, is the purpose of the equalizing res-

ervoir volume? Λ —To add volume to chamber D, above the equalizing piston.

W157-Q-What difficulty would be experienced without

this volume? A-Without the equalizing reservoir, the volume in chamber D is so small that, with the brake valve handle in Service position its pressure would drop to zero instantly.

W158-Q—How would this interfere with proper operation?

A-It would be difficult to make a moderate brake pipe reduction and practically impossible to obtain the exact amount of reduction desired in any case.

Fairbanks-Morse

Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad

F439-Q-What should be done preparatory to this operation?

A-1-Check breakers and switches for correct position on each unit.

2-Snap ON fuel pump breaker at engineer's breaker panel to be used.

3—Check engine Overspeed Trip and Governor Low Oil Shut-down button.

4-Snap ON fuel pump breaker at engine control and observe build-up of fuel oil pressure.

F440-Q-What should the fuel oil pressure build up to? A-20 to 25 psi.

F441-Q-What now should be done?

A-Pull Isolator to right and turn against spring pressure to START position and pull to right.

F442-Q-How long must this position be held?

A-Hold until engine fires and lube oil pressure reaches 7 to 9 psi. The engine should start turning promptly and firing should occur within a few revolutions.

F443-Q-If engine fails to fire, what should be done? A-If engine fails to fire, release isolator and repeat.

F444-Q-What should be done if failure again occurs? A-Investigate for cause, as continued unsuccessful attempts will drain the batteries.

F445-Q-What should be done to put engine on the line? A-To put engine on the line, turn Isolator to RUN position.

F446-Q-What will cause engine to fail to deliver power? A-Engine will not deliver power if starting contactors stick closed.

F447-Q-What precaution must be taken when placing engine on or taking it off the line?

A-Do not place engine on or take it off the line while the dynamic brake is applied.

F448-Q-What damage may be caused by failure to take

this precaution? A—Voltage surges may break down power circuit insulation, or control of train may be upset.

Starting and Accelerating

F449-Q-What should be checked before moving the locomotive?

A-Check to make sure that Main Reservoir pressure is being maintained at 130-140 psi.

F450-Q—What should follow? A—1—Move reverse lever to desired position. 2— Position Selector Lever.

F451-Q-How should the Selector Lever be positioned when locomotive consists entirely of C Line units? A-Position 4.

F452-Q-Suppose that Locomotive consists of different models of units?

A-In this case the selector lever should be placed in the position required for such a situation.

Bulletin 1706, Sec. 104-A, Page 4.

F453-Q-What action is required when ready to move the

A-1-Place foot on Safety Control Pedal. 2-Release Independent Brake. 3-Open throttle as required.

F454-Q-What must be done to pump up train line after coupling to train

A-1-Snap OFF generator field breaker. 2.-Move reverse lever to Neutral. 3-Open throttle as needed but not beyond 6th notch.

F455-Q-Is it permissible to use sand with this locomotive? A-Yes, whenever necessary to forestall wheel slippage.

F456-Q-Is the use of sand recommended?

A-Yes, to obtain maximum performances (railroad instructions permitting), where slippage is likely to occur.

(Turn to page 80)

luggage rack with illuminated seat numbers



Now, with illuminated seat numbers located at the end of the brackets and directly over each seat, new convenience is added to the tested and proved features of Adlake Luggage Racks. A glance tells the passenger "This is your seat!"

Safe and sturdy, built to take abuse and loads. Sweeping in line, to harmonize with modern railroad car design, and finished for attractive appearance. No wonder Adlake Luggage Racks are the choice of railroads all over America!

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QUESTIONS and ANSWERS

General Motors

Diesel-Electric Locomotives

This series of Questions and Answers pertains to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

- G496-Q—How can this negative power be used?
 A—To retard the speed of the train.
- G497-Q—What is the name of this feature? A—This feature is known as the dynamic brake, and is especially useful as a holding brake on descending grades.
- G498-Q—Explain the principle of dynamic braking.

 A—The traction motor armatures being geared to the axles are rotating whenever the train is moving. When using the dynamic brake, electrical circuits are set up which change the traction motors into generators.
- G499-Q—How does this action serve to retard a train?

 A—Since it takes power to rotate a generator, this action has a retarding affect on the train.
- G500-Q—What becomes of the power thus generated? A—The power thus generated is dissipated in resistors, called grids, which are cooled by a motor-driven fan.
- G501-Q—Where are the grids and fan located?

 A—In the top of the carbody.
- G502-Q—From where does the grid cooling fan receive it's power?

 A—From that generated by the No. 3 traction motor.
- G503-Q—What switch should be checked before using the dynamic brake?

 A—The unit selector switch located next to the instrument panel.
- G504-Q—How should the unit selector switch be set?

 A—It should be set to correspond with the number of units in the locomotive consist.
- G505-Q—What should be the position of the reverse lever?

 A—See that the reverse lever is in the direction in which the locomotive is moving.
- G506-Q—What should follow?

 A—Following this, place the throttle in IDLE.

(Manual 2310, page 216)

- G507-Q—What then should be done in about 10 seconds?

 A—Wait about 10 seconds and move the transition lever to OFF position.
- G508-Q—What takes place with the transition lever in OFF position?

 A—In the OFF position the dynamic braking circuits are partially established and, depending upon the speed of the train, enough braking may be present in this position to bunch the slack.
- G509-Q—What can be done if necessary?

 A—If necessary, move the lever to B and wait until the slack is bunched.

- G510-Q—What may be done after the slack is bunched?

 A—After the slack is bunched, the lever may be moved farther to the right to give the desired braking effort.
- G511-Q—What can the dynamic brake be compared with? A—The dynamic brake is, in effect, very similar to an independent brake.
- G512-Q—What would, in this case, represent the brake cylinder gauge? A—The load indicating meter.
- G513-Q—What precaution must be taken with respect to the position of the load indicating meter needle? A—The needle should not be allowed to remain beyond the 600 ampere marking on the dial of the meter.
- G514-Q—What warning feature is used?

 A—The dynamic brake warning light, which must not be permitted to stay lit.
- G515-Q—In either case, what must be done?
 A—In either case slightly reduce the brake (transition) lever until these conditions are remedied.

Problem Page

Do Diesels Start Fires?

(Continued from page 70)

July" fashion some 20 to 30 minutes after reaching full power. This condition has occurred generally over one railway system without regard to down time, idle time or other operating maintenance functions.

At a conference with the U.S. Forest Service and the representatives of 19 railroads operating in the states of Washington and Oregon, it was disclosed that 11 per cent of the forest fires of 1951 were caused by railroads and that diesel locomotives started almost as many fires as did the steam-operated locomotives.

While we have found that many types of locomotives with diesel power may start fires, a check in 1955 disclosed that certain types powerer by having a direct exhaust, are the worst offenders. Three railroads operating in New York State have voluntarily installed spark arresters over exhaust openings on diesels.

While it is now generally recognized that suitable spark arresters should be installed on diesel locomotives, inspections have also disclosed that not all fires caused by diesels are hot carbon deposits emitted from the stack. Frequently, it has been found that brakes have caused the trouble. Wheel bearings often leak oil on the brake shoes, causing carbon to form, which, upon a long, hard application of brakes, becomes heated and falls off, igniting inflammable material along the right-of-way.

While permission has been granted to suspend the regular patrols following trains in many cases where only diesel locomotives are operated, it has been only on condition that the rights-of-way be kept clear of all inflammable material and that men and equipment be kept available to resume patrols immediately if deemed necessary by the Conservation Department.

BOX CAR SIDE DOORS



designed and built by Pullman-Standard

- · Design: by the world's largest carbuilder . . . with fifteen years' experience in door manufacturing.
- Sixe: 9' 11" or specified height. 6'-7'-8'-9' or specified width.
- · Complete with fixtures and subparts, all to P-S design.
- Panels of .10-inch corresion-resistant copper bearing steel. Lock, starter and bumper of cast steel. All parts
- 5" rollers in door roller assembly insure easy operation.
- · Precision fabricated, embossed for strength, assembled by arc-welding.
- All around sealing arrangement excludes dirt and weather, safeguards
- · Self-protecting design and fabrication excellence mean long life, easy maintenance.

Pullman-Standard has designed, built and laboratory and service tested a new box car side door, with integral fixtures, to fill the needs and specifications of the railroad industry. Offering maximum lading protection from dirt and weather, this new door is sealed all around by specially designed interlocking contours. The unit rolls smoothly and easily on large 5-inch diameter rollers with hardened roller bearings. The safety latch and door lock work as a unit. And the safety latch automatically locks the door in either the open or closed position after one car impact. The entire door and fixture unit is made for lasting service, durability and rugged strength.

After extensive field research to determine railroad and shipper requirements, prototypes of this door were designed, built and put into continuous laboratory and in-service tests three years ago. Every possible test was applied time and time again. The P-S Door withstood every abuse. Example: over 75,000 severe individual roller and bearing impacts were test-applied to prove the door roller assembly.

Completely confirmed as meeting the needs of the railroads, this new unit is now available for application on new PS-1 Box Cars. Already in service or on order for six railroads; Birmingham Southern, Duluth South Shore and Atlantic, Kansas City Southern, Monon, Rutland, Pittsburgh and West Virginia and the U. S. Army.

Replacement parts will be kept on hand by Pullman-Standard, and railroad orders will be filled immediately from inventory.

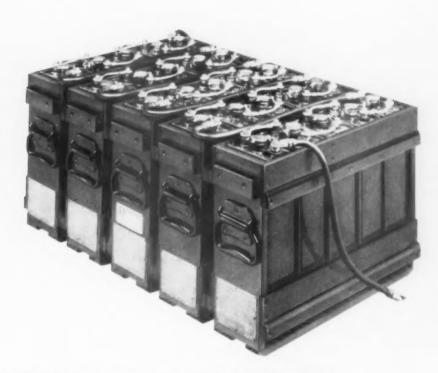
For full information on the new P-S Box Car Side Door, and how it can be applied to PS-1 Box Cars now on order, write for literature or contact the nearest Pullman-Standard sales office.

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

SUBSIDIARY OF PULLMAN INCORPORATED
79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS
PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

Stand-by power to spare. Railroads depend on EDISON batteries for four important power services · operating power on industrial trucks stand-by power for communications equipment on caboose cars stand-by power for air conditioning and lighting on passenger train cars · stand-by power for all types of railway

where you need it most-



an EDISON battery won't let you down

UNEXPECTED delays may stop a freight train...but it's at moments like this that communications and other electric services on caboose cars must keep going.

With Edison batteries as stand-by power, communications equipment will operate at top performance for long periods while the train is motionless and generator power is interrupted. The reason is, Edisons can be safely charged at higher rates, assuring a continuously high charged con-

dition ready for any emergency.

Another important advantage in freight train service is the rugged all-steel construction of Edison batteries. They're built to withstand the jarring and other mechanical abuse associated with freight operations.

Edison batteries are not subject to sudden failure. They are so dependable that, after years of the heaviest duty, they may be shifted to lighter loads, such as railway signaling and communications, where the utmost reliability is still of paramount importance. No other battery can deliver so much work per dollar of cost.

Further information on Edson's foolproof operation, light weight, resistance to temperature extremes, easy maintenance and other features is available from your local Edison field engineer. Call him today or write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

You get more dependable power-lower over-all cost with





SUPPLY TRADE NOTES

(Continued from page 12)

UNION ASBESTOS & RUBBER COM-PANY.—William H. Fehrs, vice-president, has been named manager of sales for the Hand Brake Division and asbestos products to railroads.

AIR REDUCTION COMPANY.—The general offices of Air Reduction are now at 150 East 42nd street, New York.

MILLER LUBRICATOR COMPANY,—Ray L. Nelson, formerly AAR chief mechanical inspector, has been appointed chief field representative, with headquarters at 80 East Jackson houlevard, Chicago.



R. L. Nelson



W. T. Robinson

5 big advantages of



PORUS - KROME

Good for the Life of your Engines

- INCREASES CYLINDER LIFE 3 TO 5 TIMES.
- INCREASES PISTON RING LIFE UP TO 50%.
- . ELIMINATES STOCKING OF OVERSIZED PISTONS AND PISTON RINGS.
- DEFINITELY CONTRIBUTES TO REDUCED DOWNTIME FOR ENGINES.
- DEFINITELY CONTRIBUTES TO A REDUCTION IN LUBE OIL CONSUMPTION.

-Write Dept. F-1, VAN DER HORST CORP., OLEAN, N. Y .-

OLEAN, NEW YORK HILVERSUM, HOLLAND



TERRELL, TEXAS

LOS ANGELES, CALIFORNIA

*SparTan Engineering

E. I. DU PONT DE NEMOURS & CO.— W. T. Robinson has been named head of the newly formed fuel-oil division in the du Pont Petroleum Laboratory. Mr. Robinson will be responsible for technical service on diesel oils, home burner oils, and jet fuels.

STANDARD CAR TRUCK COMPANY,— James H. Shaffer of the Seaboard Railway Equipment Company, Butler, Pa., has been appointed sales representative and agent in the northeastern seaboard area for Standard Car Truck.

ROSS & WHITE CO.—Max R. Brockman, retired assistant vice-president, mechanical, of the Southern, is now representing Ross & White to southeastern railways. Stan H. Haigh, St. Paul, Minn., has been named representative for railways in the St. Paul and Minneapolis district.

AMERICAN BRAKE SHOE COMPANY.

—Stephen S. Conway, president of Brake
Shoe & Castings Division, has been named
a vice-president of the parent company.

Brake Shoe and Castings Division.— Fred P. Biggs, chairman, and George E. Anne, vice-president, have retired.

ELECTRIC STORAGE BATTERY COM-PANY.—E. J. Duyer, secretary, has been elected also a vice-president.

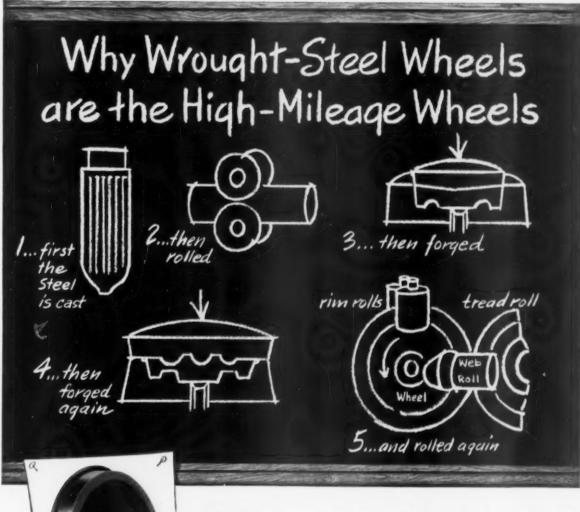
WYANDOTTE CHEMICALS CORPORA-TION.—W. P. Cornwell has been appointed sales manager, Dallas, Tex., district. Mr. Cornwell was previously located at Wyandotte, Mich.

METAL & THERMIT CORPORATION.— H. D. McLeese, general sales manager, has been elected also a vice-president.

GREGORY INDUSTRIES, Inc., NELSON STUD WELDING DIVISION.—Richard E. McGinnis has been appointed manager of field sales.

MINNESOTA MINING & MANUFAC-TURING CO.—Joseph E. Van Kirk has been appointed special sales representative for eastern railroads by the reflective products division.

(Turn to Page 88)



To understand why wrought wheels have the strength and toughness needed for high mileage, it is necessary to know how they are manufactured. At Bethlehem, for instance, there are several fundamental steps that contribute directly to the desired result.

Before all else comes the steel, of course. It is melted to meet every standard of AAR specifications. Then it is cast into ingots, then rolled into blooms—the first of four steps in which the steel is "worked." Next, after the blooms have been sliced, the wheel blocks receive two forgings. They have now assumed approximately their final shape. The last step in the "working" takes place in a vertical rolling mill, where tread, rim, and web are rolled to size.

These four steps improve the properties of the finished wheel. They help achieve a compact internal structure and smooth surface characteristics. Beth-

lehem wheels that are made by this process are durable and urong — wheels that will give high mileage.

You can't sell short the experience of nearly half a century. That's how long this organization has been making wrought-steel wheels – freight, passenger, locomotive – for the country's great railroads. Today's Bethlehem wheels are the best that have ever come out of our shops – which means that you can't buy finer ones anywhere.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation, Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM WROUGHT-STEEL WHEELS

COMPANIONS TO BETHLEHEM FORGED-STEEL AXLES

FREIGHT . PASSENGER . DIESE



KEY TO RAILROAD PROGRESS . . . ELECTRICAL PIONEERING



General Electric-Equipped **Multiple-Unit Cars** Provide Better Service, **Lower Operating Costs** for the New **Long Island Rail Road**

Seventy-four modern General Electric-equipped Multiple-Unit Cars, recently delivered to the Long Island Rail Road as part of a twelve-year, \$60,300,000 rehabilitation program are providing better service and reducing operating costs. Each of these new cars is equipped with four high-speed G-E truck-frame-mounted motors which are capable of providing fast acceleration and higher schedule speeds. Passengers enjoy smooth, quiet performance. Proven equipment operation and reliability will greatly reduce maintenance costs and "out-of-service" time.

The Long Island, the nation's busiest passenger railroad, carries 285,000 commuters daily between New York and the rapidly growing Long Island suburban area.

Progress Is Our Most Important Product

GENERAL & ELECTRIC





lewit-sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled haad for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

BOLT & NUT COMPANY



SUPPLY TRADE NOTES

specification.

(Continued from page 84)



R. M. Beswick



G. E. Carothers



K. Chrissinger



D. F. Scherer

WESTINGHOUSE AIR BRAKE COM-PANY, Am Brake Division.—R. M. Beswick has been appointed general sales manager, with headquarters at Wilmerding, Pa. G. E. Carothers, assistant manager, succeeds Mr. Beswick as southeastern manager at Washington, D.C. Kenneth Chrissinger has been appointed assistant eastern manager at New York, and Donald F. Scherer succeeds Mr. Chrissinger as representative in the southeastern district at Washington.

ALCO PRODUCTS, INC.—Del Thomas has returned from Naval service and has resumed his position as sales representative in the San Francisco area. Robert H. Binkerd, district manager of the Pittsburgh sales office, has been appointed sales promotion manager for spring and forge products, with headquarters at Latrobe, Pa. Gilbert Fox has been appointed to direct the sale of Alco-Twin fin-tube heat exchangers in the New York area.

COOPER-BESSEMER CORPORATION.— Melvin J. Helmich has been appointed supervisor, railway engineering, and Edwin J. Fithian, Jr., project engineer, locomotive engine development.



Dr. J. T. Blake

SIMPLEX WIRE & CABLE CO.—Dr. John T. Blake has been elected vice-president, succeeding J. Arthur Gibson, retired. Dr. Blake continues also as plant manager of the Cambridge, Mass., plant.

KAISER ALUMINUM & CHEMICAL CORP.—Robert G. Beeson has been appointed railroad development engineer. C & D BATTERIES, INC.—William H. Krapt has been appointed a sales representative in the Pittsburgh area, and Stanley J. Mahurin has been appointed Los Angeles sales representative.

Obituary

FREDERIC H. BASSETT, district sales manager of the Denver office of American Steel Foundries, died on April 29.

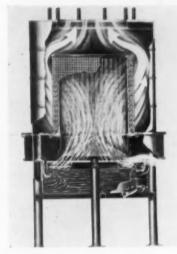
EQUIPMENT

(Continued from page 6)

Non-Skid Tread Plate

This non-skid abrasive aluminum tread plate is said to provide sure footing even when covered with oil, grease or water, It is designed for such applications as coach steps and aisles, runboards and catwalks.

The product is rolled from ingot by a method which provides a fused aluminum abrasive oxide on one surface of the plate. The layer of abrasive is metallurgically bonded to the aluminum plate. When welding, the abrasive layer does not separate from the plate. The non-skid surface has proved valuable in preventing slippage on trucks carrying wet cargoes and at industrial locations where oil may collect on floor surfaces. Durable and corrosion-resistant, it can be shop fabricated by most commercial methods, including shearing, sawing, punching and drilling. Aluminum Company of America, Dept. RLC, Alcoa Building, Pittsburgh 19.



Oil Bath Air Filter

Extremely low-pressure loss and high efficiency are features of this Model LPD oil bath air filter. Low pressure drop operation is achieved without any moving parts or outside energy supply. The device can be utilized for a broad range of compressors, blowers and engines.

The filter reduces energy requirements, making it possible to eliminate power-consuming motors. It is accomplished by reversing the conventional oil and air circuit. The air-flow regulator tube is pre-set at the factory so that, within the filter's rated capacity range, air velocity will be sufficient to insure full oil washing, yet keep pressure drop low.

These units come in four capacity ranges for variable speed engines and compressors. Air-Maze Corporation, Dept. RLC, 25000 Miles road, Cleveland 28.

Vapor Degreaser

The unit operates on the manufacturer's rotomatic principle, which permits a predetermined and accurately controlled degreasing time-cycle, and incorporates a cool dip rinse to wash off chips and other insolubles.

The dip cycle operates in two ways. First, the liquid solvent rinse gets back into blind holes and recesses in the work being degreased. In addition, the work is

Double cars one man can service



Yu Brasser is extremely mobile, operates on both paved and unpaved surfaces, or snow and ice.

Use Self-Propelled YU-BRASSER

One Man Removes and Trims Brasses on Spot, Opens Oil Rolls, Replaces Brass in just 2 to 3 minutes; also Lifts Cars for Inspection and Greasing of Side Bearings and Center Plates.

Yu-Brasser, the only mobile, combination journal jack, brass trimmer and car lift, completely mechanizes car servicing. It's hydraulically driven and operated...speeds many phases of car servicing, including box repacking.

Operators Like Safety—Its safety and ease encourage inspections. Spotting, lifting and release of jack is controlled from steering platform—no dangerous hand placement. Makes journal box servicing a preferred job.

Quickly Amortized – Using Yu-Brasser, one man jacks journal boxes and cars, empty or loaded, in seconds. It more than doubles the number of cars he can service, cuts servicing costs 50 to 75%. By trimming on spot and

replacing already-seated brasses, you save 50% or more on brass. These savings quickly pay for your Yu.Brasser.

You can buy Yu-Brassers on try-before-you-buy or lease basis. For full details, write, wire or telephone Now to Earle C. Webster, National Sales Representative, 55 New Montgomery St., San Francisco 5, Calif GArfield 1-7119



Car lift extension in use. See how Yu-Brasser works parallel with car, important in cramped quarters.

Y105

Manufactured by

YUBA MANUFACTURING CO. 701 H Street, Benicia, California



REFLECTOSCOPE TEST BULLETIN



ULTRASONIC INSPECTION with journal test car cuts costs ~ speeds up testing



tested daily. The operator drives easily and rapidly beside the track from one journal box to the next. Reflectoscope search unit is placed on journal's end.

As many as 320 journals can now be



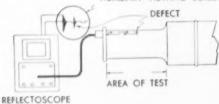
Fleet of Sperry Ultrasonic Journal Test Cars proves to be an efficient inspection technique that saves time and money for the C&O. Positive testing is accomplished without the problems and expense of removing the axle from the car. Freight car journals are checked while cars are in the yard or undergoing repairs,



Early detection and removal of faulty axles like this can save hundreds of thousands of dollars in time, labor and expense.

How it Works

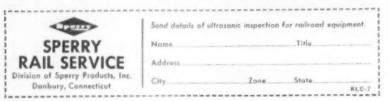
AUXILIARY VIEWING SCREEN



Reflectoscope sends a beam of sound energy into the axle and how a crack reflects a portion of this energy back

The sketch above shows how the to the search unit. A complete picture of this is shown to the operator on a cathode ray tube mounted directly in front of the driver's seat.

MECHANICAL DEPARTMENTS find that Sperry Rail Service offers the most advanced nondestructive inspection equipment yet developed for practical railroad applications. For complete information return the attached coupon.





cooled so that in each complete cycle of baskets or tumblers there are two separate condensing vapor stages.

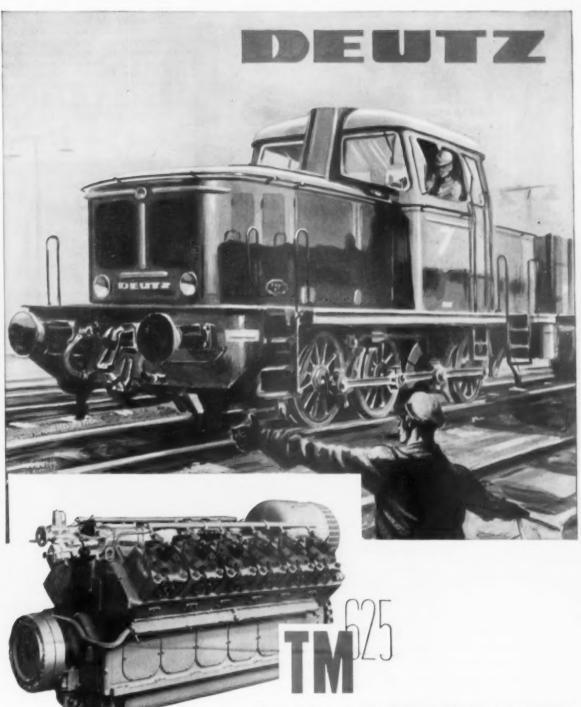
Straight work baskets are used where work is relatively free from recesses or the tendency toward nesting. If these conditions exist, the unit is available with tumblers which provide thorough cleaning action. Time cycles are completely adjustable so that close control of cleaning can be kept. A flusher spray attachment is also available, if desired. These degreasers range in size from 1,800 to 4,000 lb per hr in electrically heated, steam heated and gas heated models. Phillips Manufacturing Company, Dept. RLC, 3541 West Touly avenue, Chiсако 45.



Portable Paint Heater

With this unit, the hot spray process with its many advantages is taken directly to the job site. The complete heater is mounted on a two-wheel cart. According to the manufacturer, the device provides new efficiency for the maintenance and contract painter.

With the heater, a heavier film build can be obtained since a greater amount of solid is deposited in a given area. While applying this coat, material costs are saved as overspray and fog are reduced as much



DIESELLOCOMOTIVES

powered by slow-speed 2-stroke DEUTZ diesel engines and equipped with hydraulic transmissions, for shunting and line service, with 4 to 12 cylinders, output ranging from 240 to 2000 HP

KLÖCKNER-HUMBOLDT-DEUTZ AG. KÖLN





Garlock diesel replacement parts are pre-stocked in handy packages, ready for shipment.

Your GARLOCK Salesman

has a better understanding of the problems of railroad packing and sealing because that's his sole responsibility. For 68 years, Garlock representatives have applied their knowledge to solving the packing problems of railroads.

Profit by this experience. It is yours for the asking.

Remember, diesel parts are only part of "the Garlock 2,000"
... two thousand different styles of packings, gaskets, and
seals to meet all your needs. It's the only complete
line...it's another reason you get unbiased recommendations
from your Garlock representative. Call him, or
write for complete diesel parts-and-price list.

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, contact one of the 30 sales offices and warehouses throughout the U.S. and Canada.



Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints



as 75 per cent. Air consumption is cut because lower atomizing pressures are utilized by using fast, active thinners.

The devices are manufactured with either 3- or 6-kw heaters, with the higher capacity model producing ample heat for more than one spray gun. The 3-kw model operates on 115 volts, while the other unit requires 230-volt service. Temperature of the water in the unit is controlled by an adjustable manual thermostat. DeVilbiss Company, Dept. RLC, 300 Phillips arenue, Toledo 1.



Hand Gun Welding Process

The C-OManual process was developed to fill the need for a welder that offers the welding speed advantages of fully-automatic operation without the related high jig fixture tooling cost. The process contains a hand gun, control unit, and a 600-amp dc power source. It utilizes carbon dioxide gas to shield the arc.

According to the manufacturer, automatic control of current compensates for all operators' variations in arc length. The process affords deep penetration and high metal deposits. The visible arc speeds the spotting of the nozzle for faster welding. No flux is needed and subsequent slag removal problems are eliminated, giving clean and non-porous welds. Wire speeds up to 600 in. per min. are possible.

The gun is lightweight and is easy to use. It has no "O" rings, thus eliminating the source of leaks and maintenance prollems. Controls on the front panel are grouped for easy reading. Welding Products Division, A. O. Smith Corp., Dept. R.L.C., Milwaukee I.

Fluorescent Floodlight

A fluorescent floodlighting designed to meet the requirements of outdoor lighting applications has been called the fluoroflood. The new fixture combines many of the features of fluorescent and floodlight units to produce a high level of evenly-distributed light over a wide area. The eightfoot rapid-start lamp generates 7250 initial lumens and offers all-weather illumination. An acrylic plastic cover is available for use with the unit and is recommended for in-

How a better precision-fit Guide Pin Bushing* is made in less time with

SHELBY SEAMLESS MECHANICAL TUBING



Here is another manufacturer that is turning out a better product in less time by using Shelby Seamless Steel Tubing.

The product, a wring-fit bushing, makes possible a truly precision die set, which permits closer working tolerances and extends the life of the dies to a degree never before thought possible. The bushing itself is harder, stronger, more uniform, longer lasting and better fitting.

When Shelby Seamless Tubing is used, no boring is necessary—the hole is already there. It offers more, however, than just a pre-bored hole. It combines to an exceptional degree the qualities of strength, uniformity, and dimensional accuracy. These advantages, coupled with the workability and excellent machining properties of Shelby Seamless, make it the ideal material for critical mechanical applications like this.

Available in a wide range of diameters, wall thicknesses, various shapes and steel analyses, Shelby Seamless Mechanical Tubing is produced to exacting standards by the world's largest manufacturer of tubular steel products. Get in touch with our engineers if you would like help in applying Shelby Seamless to your specifications.

. Manufacturer's name on request.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



SHELBY SEAMLESS MECHANICAL TUBING

UNITED STATES STEEL





HOSE and FITTINGS

For fuel lines, oil lines, water, antifreeze, L-P gas, vacuum gage, and air applications. High pressure and low pressure service.

Durable abrasion resistant, flexible, small bend radii.

Detachable, reusable fittings are

leak-proof and quick on-and-off.

Buy ready-to-use hose assemblies or make up your own from bulk hose and fittings. Types and sizes for every application at your industrial supply house.

Write for Bulletin S-2D



POST OFFICE BOX 10398

FORT WORTH, TEXAS

Branch Plants: Los Angeles and Toronto Sales Offices: Atlanta, Chicago, Dayton, Houston, Kansas City, Los Angeles, New York, Portland (Ore.), Toronto, Tulsa, Wichita stallations in cold climates or during winter months. The cover is said to protect the lamp from drafts which materially reduce its light output at low temperatures. The fixture is designed to house the 96T12/CW/RS rapid-start fluorescent lamp which has been specially engineered for outdoor cold weather applications. The fluoroflood has been engineered to withstand the effects of storm and wind damage but weighs only seven pounds, and is said to be easy to install,

The unit is suitable for a number of outdoor applications, including parking lots, tunnel entrances, outdoor advertising poster panels, loading platforms, and other areas where a low cost, short range light source is desired. General Electric Company, Dept. RLC, Outdoor Lighting Division, Hendersonville, N.C.

Porcelain Aluminum Ceilings

Headliners or ceilings of porcelainized aluminum, as well as advertising racks of the same enameled metal are now being used in New York City subway trains. The enamel, a vitreous, inorganic coating, is bonded to the aluminum alloy at red heat and is said to render the metal impervious to corrosion. According to the manufacturer, the finish will not fade, stain, rust or discolor.

Because of its permanent finish, it never needs repainting and maintenance is low since a mild detergent can clean it. Aluminum's resistance against alkalis and thermal shock is also fortified by the enamel. The product is available in a variety of colors. Sorkin Enterprises, Dept. RLC, 11 Broadway, New York 4.

Expansible Compounds

Two thermosetting, self-curing polyisocyanate foams for insulating and reinforcing voids between structural members have been designated as Scotchfoam Expansible Compounds Type A and Type I. They are adapted to filling cavities where light weight, structural strength, stiffening, vibration dampening, and durability are desirable factors.

Both compounds are a two-part liquid formulation which, when mixed with a catalyst under proper conditions, can be foamed-in-place to produce a rigid cellular material that will not break loose, settle or sag. Application may be made by pouring or spraying. Scotchfoam I has a volume expansion of approximately 20 to 1.

Design advantages include low weight factor, adhesion to many types of surfaces without the need for supplementary adhesives or mechanical fasteners, curing without heating, freedom from fire hazard during application, and applicability to irregular surfaces without necessity of cutting and fitting operations.

These low density polyisosocyanate foams have good structural strength, thermal stability, and insulating properties (thermal, acoustical, electrical), adhesion to most



Clean Diesel Pistons Automatically with



Lobor reduced from 5 men to 1 . . . Cost per piston cut from \$1.24 to 25¢ . . . That's the record reported by one well-known railroad overhaul shop after switching from hand methods to automatic VAPOR BLAST LIQUID HONING for diesel locomotive piston cleaning!

Today, instead of 5 men with hand scrapers, emery cloth and wire brushes, the job is done by 1 man—in a specially designed semi-automatic Vapor Blast Liquid Honing machine. Pistons are cleaned more thoroughly, more uniformly, and precision tolerances in ring grooves are easily maintained—at only 20% of former costs.

Write . . . for your copy of VB Application
"Brief" No. 4 on "Diesel Engine Overhaul"

Vapor Blast and "Liquid Honing"
 are trademarks



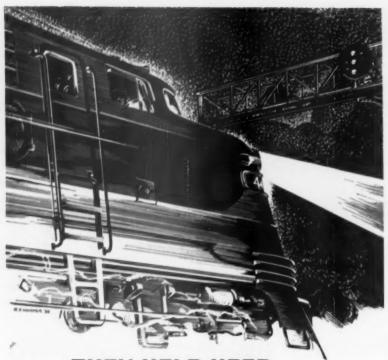
WAPOR BLAST MFG. CO.

3053 WEST ATKINSON AVE.



Piston-Cleaning Time-Saver

Here's the VB (model D129-49) Semi-Automatic Liquid Honing machine that cuts piston cleaning costs to the bone! Three fixed abrasive guns move up and down automatically over the face of the piston as it rotates. One gun cleans the inside, and another gun is used for 'high-spotting' and cleaning the piston crown. Machine is completely self-contained, requiring only air, water, power and exhaust connections. One man does the whole job.



THEY HELP KEEP
DIESEL-ELECTRICS ROLLING

...profitably

When you use Stackpole brushes, you have maximum assurance that there won't be extra "time out" for costly commutator reconditioning beyond the usual 300,000-mile overhauls.

Stackpole brushes eat up the miles . . . but NOT the commutators!

STACKPOLE CARBON COMPANY
St. Marys, Pa.

STACKPOLE

diesel electric

BRUSHES

BETTER BRUSHES FOR ALL ROTATING ELECTRICAL EQUIPMENT ELECTRICAL CONTACTS • CARBON-GRAPHITE BEARINGS • CLUTCH RINGS • SEAL RINGS • TROLLEY AND PANTAGRAPH SHOES • WELDING CARBONS • RAIL BONDING MOLDS • VOLTAGE REGULATOR DISCS • FRICTION SEGMENTS • RESISTANCE WELDING AND BRAZING TIPS • HIGH PURITY CARBON • ELECTRIC FURNACE HEATING ELEMENTS . . and dozens of other corbon, graphite and molded powder products.

metals, plastic, wood, glass and ceramics. They are insoluble in water and most petroleum products and chemical resistance is considered generally good. Type 1 polyisocyanate foam can be applied between exterior and interior floor panels on railroad passenger cars to provide necessary sound-deadening and insulation characteristics. Minnesota Mining & Manufacturing Co., Adhesives and Coatings Division, Dept. RLC, 411 Piquette avenue, Detroit 2,



Strap Cutter

Better cutting action and greater ease of operation are said to be the two features of this heavy-duty strap cutter, No. 550. A new jaw design makes one-hand strap cutting a smooth and easy operation. The jaws will slice through metal up to 2 in. by 0.05 in.

Metal feet on the bottom handle steady the cutter for one-hand operation. Stress points have been holstered and wearing parts reinforced without adding to its total weight. A. J. Gerrard & Co., Dept. RLC, Metrose Park, Ill.

Permanent Spray Lubrication

A new, instant drying, long lasting graphite lubricant, Spray Graph, is now available in 6 oz. spray containers. This graphite spray can be applied to both metallic and non-metallic surfaces. It is said to increase the life of moving parts and reduce maintenance costs. It is also claimed there is no surface build-up or drippage of the lubricant. Spray Graph provides lubrication at temperatures ranging from 100-deg below zero to 800-deg F. It does not pick up lint, dust or dirt. Oxidation, corrosion and friction are greatly reduced and sticking is prevented.

For application the surface is cleaned with a degreasing solvent and Spray Graph is lightly sprayed across it. The lasting lubricating film and the self-spray method of application permit lubrication



LOW CONDUCTIVITY

Thoroughly washed and sterilized, allhair heat barrier. Rated conductivity -.25 btu per square foot, per hour, per degree F., per inch thick.

LIGHT WEIGHT

Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by

PERMANENT

Does not disintegrate when wet, resists absorption. Will not shake down, is fireresistant and odorless.

EASY TO INSTALL

Blankets may be applied to car wall in one piece, from sill to plate and from one side door to the other. Self-supporting in wall sections between fasteners.

COMPLETE RANGE

STREAMLITE HAIRINSUL is available 1/2" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings are available.

HIGH SALVAGE VALUE

The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving

Sudden and extreme temperature changes do not harm valuable perishables when they are shipped to market in cars insulated with dependable Streamlite HAIRINSUL.

Leading refrigerator car builders recognize this fact. That is why, for half a century, they have been specifying HAIRINSUL, the dependable all-hair insulation. They know it is the most efficient, most economical under ALL conditions . . . and that Streamlite HAIRINSUL weighs 40% less.

More reasons why refrigerator car builders prefer Streamlite HAIRINSUL are given at the lett. There are more, too. Write for complete data.

AMERICAN HAIR & FELT COMPANY

Merchandise Mart . Chicago, Illinois



SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED.

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

- MEASUREMENT EQUIPMENT. 40-page "testing-instruments reference book" (GEC-1016) contains complete product information, including applications, sources of additional information, and pictures. Instruments range from simple thickness gages to the mas spectrometer leak detector for research, production laboratories, and educational use. (Write: General Electric Company, Dept. RLC, Schenectady S, N.Y.)
- 2. UNIT HEATERS. 36-page bulletin (700A) describes Herman Nelson horizontal and vertical unit heaters. Includes complete hot-water and steam performance tables, dimensions, selections, applications, descriptions of cabinets, elements, motor mountings, fans and accessories, controls, suggested layouts, piping diagrams, and other technical data. (Write: American Air Filter Company, Dept. RLC, 215 Central Avenue, Louisville, Ky.)
- CRANKSHAFTS. 8-page 2-color bulletin (143) describes the three pump sizes of the Hydreco 3600 Series gear-type hydraulic pumps (for large industrial and mobile equipment applications); cut-away drawing shows mechanical features; selection data chart included. (Write: Kalamazoo Div. New York Air Brake Co., Dept. RLC, Kalamazoo, Mich.)
- 4. FREIGHT CAR. 4-page 2-color reprint contains factual report of service record of the PS-1 Standardized Box Car, the first standardized freight car built. This report "Service Record of a 10-Year Veteran" also shows present condition of this car, Lehigh Valley's number LV-6200. (Write: Pullman-Standard Car Mig. Co., Dept. RLC, 79 E. Adams St., Chicago 3.)

- 5. CARBON DIOXIDE. 4-page catalog (ADPC-26) "There's A Pureco CO₂ system For Your Inert Gas Welding Needs" describes Pureco CO₂ supply systems, gas flow, and shows typical applications. (Write: W. Goerg, Ir., News Bureau, Pure Carbonic Co., Air Reduction Co., Dept. RLC, 60 E. 42nd St., New York 17.)
- WIRE. "People, Progress & Products" 28-page booklet describes the story of 125 years of wire making. (Write: American Steel & Wire Division, United States Steel Corporation, Dept. RLC, Cleveland, Ohio.)
- 7. GEARMOTORS. 8-page 2-color bulletin (E-2408) "Reduce Speed" describes line of Reliance Gearmotors; two-page cutaway view shows extra features and engineering design; discusses maintenance and wide variety of types. (Write: Reliance Electric & Engineering Co., Dept. RLC, 1088 Ivanhoe Rd., Cleveland 10, Ohio.)
- 8. CELORON. 14-page catalog (C-56) gives technical information and various specification tables on Celoron, a synthetic resin impregnated material for applications requiring toughness, resiliency, mechanical strength and controlled electrical properties. (Write: Continental-Diamond Fibre, Dept. RLC, Newark, Del.)
- WELDING EQUIPMENT. 20-page illustrated bulletin (GEC-1033) gives ratings, dimensions, and specifications for all types of G-E welding equipment, electrodes, and accessories, including a-c and d-c general purpose and industrial welders, semi-automatic and automatic equipment, and carbon block brazing equipment. (Write: General Electric Company, Schenectady 5, N.Y.)

of odd sizes and shapes of material as well as surfaces in hard-to-reach locations. Spray Graph is also distributed in bulk amounts for industrial use. This new lubricant has been used in the aircraft and automotive industries, and for machine tools, office machines and precision instruments. American Resin Corporation, Dept. RLC 3215 North Shefield avenue, Chicago.

Electric Steam Cleaner

Based on a new principle, water for this electric steam cleaner is converted into steam inside a coil of copper tubing, electrically heated on its outside surface. There is no flame, fire or fumes. The unit delivers 50 per cent saturated steam with the correct amount of detergent for cleaning operations. A 30-kw power supply is needed. It is available for operation on 220-, 440-and 550-volt supplies, 2 or 3 phase.

It is designed for indoor or outdoor use and is equipped with a hose to permit working in a 50-ft radius. Additional lengths of steam hose and power cable can be had. Its self-contained detergent tank gives up to 6 hr of continuous operation with every filling. Turbo Machine Company, Dept. RLC, Lansdale, Pa.



Push-On and Clamp Fittings

The push-on fitting is for low pressure use on machine tools or for shop air, water, or lubrication lines; the two-bolt clamp fitting for high pressure, heavy duty applications for hydraulic lines, steam hoses or liquid petroleum gas transmission.

The push-on fitting is brass, comes in ¼, ¾ and ½ in. sizes. It is designed for use with P54 rubber-covered hose with pressures up to 250 psi, and is assembled dry or with water as a lubricant. It comes in six types: rigid male pipe, swivel female SAE 45 deg flare, swivel female 37 deg flare, swivel male inverted nut, rigid male SAE 45 deg flare and rigid female inverted.

The Dynalok clamp fitting is made of malleable iron and is secured by two bolts. It is available in eight sizes to accommodate hose from ½ to 2 in, in diameter. With proper high pressure hoses, the fittings are rated for pressures up to 3,000 psi. Flex-O-Tube Division, Meridan Corporation, Dept. RLC, 2525 Jim Daly road, Inkster, Mich.

CASH AWARDS FOR OLDEST ISSUES OF RAILWAY AGE

Railway Age, celebrating its hundredth anniversary this fall, will award \$100 to the person or firm which submits proof of awnership of the copy of this paper—or its predecessors—bearing the oldest dateline. Holder of the second oldest copy will get \$50.

Holder of the oldest issue and runners-up will be announced in Railway Age's Centennial Issue in September which will "take stock" of the railroad industry on a comprehensive scale with "a look behind, around, and ahead."

Railway Age has three separate lines of ancestry; the oldest issue of any of the three will qualify. Here they are:

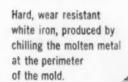
- Railroad Gazette—starting as Western Railroad Gazette, November 15, 1856, dropped "western" in 1870. Remained Railroad Gazette until merger with Railway Age in 1908.
- 2. Railway Age—started with issue of June 17, 1876. In 1891 absorbed Northwestern Railroader (founded 1887), and added its title to the masthead until 1901, when it again

became Railway Age alone. Upon merger with the Gazette the paper used the combination title Railway (later Railroad) Age Gazette. In 1918 the durable title Railway Age again emerged intact.

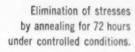
3. Railway Review—starting as the Chicago Railway Review in 1868, became Railway Review in 1879; Railway & Engineering Review in 1897 and again Railway Review in 1914. It was absorbed by Railway Age in 1927.

Do not be fooled by differences in size and appearance of the older issues. All three lines of ancestry ran numerous small advertisements — mostly non-illustrated — on the front covers—which, on Gazette and Age, were yellow. The sizes of both the Gazette and Review were considerably larger than today's Railway Age.

Please do not send the issues to us. Merely submit statement of proof, or a photostat or photograph of front cover or masthead page to Editor, Railway Age. 30 Church st., New York 7. To be eligible, entries must be received no later than July 1, 1956. Sorry, public libraries and archives don't count.



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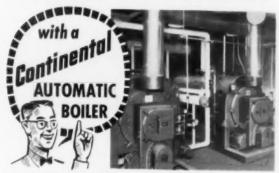
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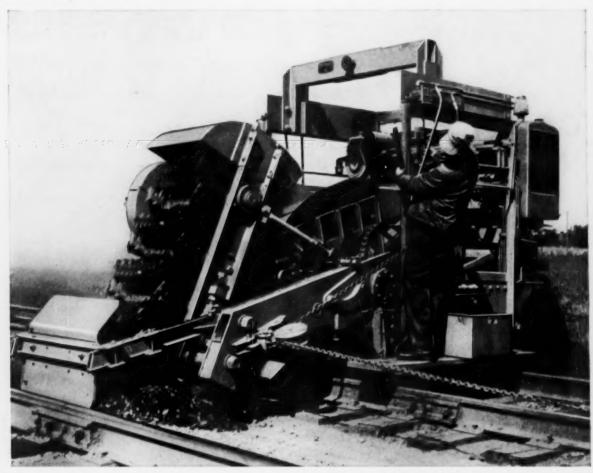
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